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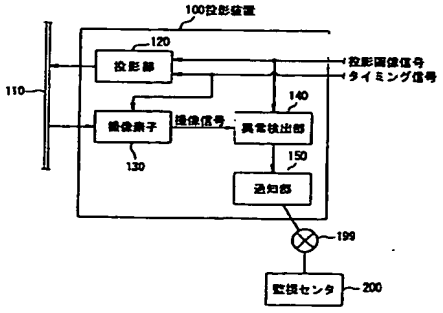
(54)【発明の名称】投影装置の監視システム、投影装置及び投影装置の監視プログラム、並びに投影装置の監視方法

(57)【要約】
【課題】　投影画面に現れる表示上の不具合を検出するのに好適な投影装置の監視システムを提供する。
【解決手段】　投影装置１００は、スクリーン１１０に画像を投影する投影部１２０と、投影部１２０で投影した実投影画像を取り込む撮像素子１３０と、撮像素子１３０で取り込んだ実投影画像に基づいて投影部１２０の異常を検出する異常検出部１４０と、異常検出部１４０で異常を検出したときに所定の通知を行う通知部１５０とを備える。異常検出部１４０は、投影部１２０で投影すべき原投影画像と、撮像素子１３０で取り込んだ実投影画像とに基づいて投影部１２０の異常を検出する。
【選択図】　図２



タイミングにて前記モノクロセンサで取り込んだものとを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする投影装置の監視システム。

【請求項１０】

請求項８において、

前記原投影画像は、異なる複数色の原投影画像からなり、

前記実投影画像は、前記各色原投影画像に基づいてそれぞれ投影された前記複数色の実投影画像を合成してなり、

前記画像取込手段は、前記各色実投影画像を取込可能となるように前記各色実投影画像に対応させて設けたモノクロセンサであり、

前記異常検出手段は、前記各色対応する投影画像ごとに、前記投影手段に入力される信号であって前記原投影画像を構成可能な投影画像信号と、前記モノクロセンサから出力される信号であって当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミング又はほぼ同タイミングにて前記モノクロセンサで取り込んだものを構成可能な取込画像信号とを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする投影装置の監視システム。

【請求項１１】

請求項９及び１０のいずれかにおいて、

前記投影手段は、投影画像信号又は投影画像情報に基づいて画像を表示する画像表示手段と、前記画像表示手段で表示した画像を光の照射によりスクリーンに投影する光源とを含み、

前記異常検出手段は、前記各色対応する投影画像ごとに所定閾値を超えたときには、前記光源が異常であると判定するようになっていることを特徴とする投影装置の監視システム。

【請求項１２】

請求項２乃至１１のいずれかにおいて、

前記異常検出手段は、前記実投影画像のうち所定位置の画素値と、前記実投影画像のうち前記所定位置と隣接した位置の画素値との差分を算出し、算出した差分が所定閾値を超えたときは、前記投影手段が異常であると判定するようになっていることを特徴とする投影装置の監視システム。

【請求項１３】

請求項２乃至１２のいずれかにおいて、

前記異常検出手段は、前記実投影画像のうち所定位置の画素値と、前記実投影画像のうち前記所定位置とは離隔した位置の画素値との差分を算出し、算出した差分が所定閾値を超えたときは、前記投影手段が異常であると判定するようになっていることを特徴とする投影装置の監視システム。

【請求項１４】

請求項２乃至１３のいずれかにおいて、

前記異常検出手段は、前記実投影画像のうち複数の検査位置について、前記実投影画像のうち当該検査位置の画素値と、前記実投影画像のうち当該検査位置と隣接した位置の画素値との差分を算出し、算出した差分の総和が所定閾値を超えたときは、前記投影手段が異常であると判定するようになっていることを特徴とする投影装置の監視システム。

【請求項１５】

請求項１２乃至１４のいずれかにおいて、

前記画素値は、基準時刻ｔから所定間隔ΔｔごとにN（Nは１以上の整数）回にわたって同位置の画素値をサンプリングし、サンプリングした画素値を加算したものであることを特徴とする投影装置の監視システム。

【請求項１６】

請求項２乃至１５のいずれかにおいて、

前記投影手段及び前記画像取込手段に同一のタイミング信号を入力し、前記タイミング

込んだ実投影画像に基づいて前記投影手段の異常を検出する異常検出手段、及び前記異常検出手段で異常を検出したときに所定の通知を行う異常通知手段として実現される処理を実行させるためのプログラムであり、

前記異常検出手段は、前記投影手段で投影すべき原投影画像と、前記画像取込手段で取り込んだ実投影画像とに基づいて前記投影手段の異常を検出するようになっていることを特徴とする投影装置の監視プログラム。

【請求項２６】

監視センタと通信可能に接続し、画像を投影する投影手段を有し且つコンピュータからなる投影装置に実行させるためのプログラムであって、

前記投影手段で投影した実投影画像を取り込む画像取込手段、前記画像取込手段で取り込んだ実投影画像に基づいて前記投影手段の異常を検出する異常検出手段、及び前記異常検出手段での異常検出結果を前記監視センタからのアクセスに応じて提供する検出結果提供手段として実現される処理を実行させるためのプログラムであり、

前記異常検出手段は、前記投影手段で投影すべき原投影画像と、前記画像取込手段で取り込んだ実投影画像とに基づいて前記投影手段の異常を検出するようになっており、

前記検出結果提供手段は、前記異常検出手段での異常検出結果を保存し、前記監視センタからのアクセスがあったときは、前記保存している異常検出結果を前記監視センタに提供するようになっていることを特徴とする投影装置の監視プログラム。

【請求項２７】

画像を投影する投影手段を有する投影装置を監視する方法であって、

前記投影手段で投影した実投影画像を取り込み、取り込んだ実投影画像に基づいて前記投影手段の異常を検出することを特徴とする投影装置の監視方法。

【請求項２８】

画像を投影する投影手段を有する投影装置を監視する方法であって、

前記投影手段で投影した実投影画像を取り込む画像取込ステップと、前記画像取込ステップで取り込んだ実投影画像に基づいて前記投影手段の異常を検出する異常検出ステップと、前記異常検出ステップで異常を検出したときに所定の通知を行う異常通知ステップとを含み、

前記異常検出ステップは、前記投影手段で投影すべき原投影画像と、前記画像取込ステップで取り込んだ実投影画像とに基づいて前記投影手段の異常を検出することを特徴とする投影装置の監視方法。

【請求項２９】

監視センタと通信可能に接続し、画像を投影する投影手段を有する投影装置を監視する方法であって、

前記投影手段で投影した実投影画像を取り込む画像取込ステップと、前記画像取込ステップで取り込んだ実投影画像に基づいて前記投影手段の異常を検出する異常検出ステップと、前記異常検出ステップでの異常検出結果を前記監視センタからのアクセスに応じて提供する検出結果提供ステップとを含み、

前記異常検出ステップは、前記投影手段で投影すべき原投影画像と、前記画像取込ステップで取り込んだ実投影画像とに基づいて前記投影手段の異常を検出し、

前記検出結果提供ステップは、前記異常検出ステップでの異常検出結果を保存し、前記監視センタからのアクセスがあったときは、前記保存している異常検出結果を前記監視センタに提供することを特徴とする投影装置の監視方法。

【発明の詳細な説明】

【技術分野】

【０００１】

本発明は、プロジェクタ等の投影装置を監視するシステム、装置およびプログラム、並びに方法に係り、特に、投影画面に現れる表示上の不具合を検出するのに好適な投影装置の監視システム、投影装置および投影装置の監視プログラム、並びに投影装置の監視方法に関する。

り込んだ実投影画像に基づいて前記投影手段の異常を検出する異常検出手段と、前記異常検出手段で異常を検出したときに所定の通知を行う異常通知手段とを備え、

前記異常検出手段は、前記投影手段で投影すべき原投影画像と、前記画像取込手段で取り込んだ実投影画像とに基づいて前記投影手段の異常を検出するようになっていることを特徴とする。

【０００８】

このような構成であれば、投影装置では、投影手段により、画像が投影される。そして、画像取込手段により、投影手段で投影された実投影画像が取り込まれ、異常検出手段により、投影手段で投影すべき原投影画像と、取り込まれた実投影画像とに基づいて投影手段の異常が検出される。異常が検出されると、異常通知手段により、所定の通知が行われる。

【０００９】

これにより、原投影画像と実投影画像とに基づいて投影手段の異常を検出するので、従来に比して、光源の不点灯の場合だけでなく実投影画像に線欠陥が発生している場合等より詳細なレベルで、投影画面に現れる表示上の不具合を検出することができるという効果が得られる。また、原投影画像と画像取込手段によって取り込んだ実投影画像との比較を行うため、実投影画像の異常を比較的正確に把握することができるという効果も得られる。また、所定の通知により投影手段に異常が発生したことを把握することができるという効果も得られる。

【００１０】

ここで、原投影画像は、投影手段に入力される投影画像信号または投影画像情報により構成される理想的な画像をいい、例えば、投影画像信号または投影画像情報により構成される理想的な画像そのものであってもよいし、投影画像信号または投影画像情報とは無関係にあらかじめ生成しておいたサンプル画像であってもよい。以下、発明２０および２２の投影装置、発明４０および４２の投影装置の監視プログラム、並びに発明６０および６２の投影装置の監視方法において同じである。

【００１１】

また、異常通知手段は、所定の通知を行うようになっていればどのような構成であってもよく、例えば、投影装置に対して所定の通知を行うようになっていてもよいし、投影装置を監視する監視センタに対して所定の通知を行うようになっていてもよい。

〔発明３〕　さらに、発明３の投影装置の監視システムは、発明２の投影装置の監視システムにおいて、

前記投影手段は、投影画像信号または投影画像情報に基づいてスクリーンに画像を投影するようになっており、

前記原投影画像は、前記投影画像信号または前記投影画像情報により構成される画像であることを特徴とする。

【００１２】

このような構成であれば、投影装置では、投影手段により、投影画像信号または投影画像情報に基づいてスクリーンに画像が投影される。そして、画像取込手段により、投影手段で投影された実投影画像が取り込まれ、異常検出手段により、投影画像信号または投影画像情報により構成される原投影画像と、取り込まれた実投影画像とに基づいて投影手段の異常が検出される。

【００１３】

これにより、投影画像信号または投影画像情報により構成される原投影画像と実投影画像とに基づいて投影手段の異常を検出するので、投影画面に現れる表示上の不具合を比較的正確に検出することができるという効果が得られる。

また、実投影画像として投影画像信号を用いたときには、画像取込手段から出力される信号をそのまま比較することにより、簡単な比較回路にて異常を検出することができるという効果も得られる。

【００１４】

【００２１】
このような構成であれば、２次元エリアセンサにより、投影手段で投影された実投影画像からエリア画像が取り込まれる。
これにより、１次元ラインセンサを用いる場合に比して、投影画面に現れる表示上の不具合を比較的確実に検出することができるという効果が得られる。また、２次元エリアセンサであるため、点欠陥や、色むら，光量むら等の局部領域の異常を検出することができるという効果が得られる。
【００２２】
〔発明８〕　さらに、発明８の投影装置の監視システムは、発明２ないし７のいずれかの投影装置の監視システムにおいて、
前記所定の通知は、前記投影手段の異常に関する異常情報および前記投影装置のイベントログを含むことを特徴とする。
このような構成であれば、異常検出手段で異常が検出されると、異常通知手段により、異常情報およびイベントログを含む所定の通知が行われる。
【００２３】
これにより、所定の通知により、投影手段に異常が発生したことのほか、投影手段の異常に関する情報および投影装置の稼動履歴を把握することができるという効果が得られる。
また、通知する情報として、異常情報およびイベントログを送付するため、過去の使用形態、機器情報から異常要因を比較的正確に検出することができるという効果も得られる。また、異常対処にむけての次の迅速なアクションに繋げることができるという効果も得られる。
【００２４】
〔発明９〕　さらに、発明９の投影装置の監視システムは、発明２ないし８のいずれかの投影装置の監視システムにおいて、
前記異常検出手段は、前記原投影画像と前記実投影画像とを対比してそれらの一致点または相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする。
【００２５】
このような構成であれば、異常検出手段により、原投影画像と実投影画像とを対比してそれらの一致点または相違点に基づいて投影手段の異常が検出される。
これにより、原投影画像と実投影画像とを対比してそれらの一致点または相違点に基づいて投影手段の異常を検出するので、投影画面に現れる表示上の不具合をさらに詳細なレベルで検出することができるという効果が得られる。また、一致点又は相違点を探すことにより、実投影画像の異常部分を比較的簡単に検出することができるという効果も得られる。
【００２６】
ここで、画像を対比することには、画像同士を対比することのほか、画像を構成可能な画像信号等（画像信号または画像情報）同士を対比すること、および画像と画像信号等とを対比することが含まれる。
また、ここで、異常を検出することには、例えば、正常時に正常である旨を通知し、異常時に当該通知を行わず、通知が切断した場合に異常であるとして、異常を検出することも含まれる。
【００２７】
〔発明１０〕　さらに、発明１０の投影装置の監視システムは、発明９の投影装置の監視システムにおいて、
前記異常検出手段は、前記原投影画像と、当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミングまたはほぼ同タイミングにて前記画像取込手段で取り込んだものとを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする。

して、異常検出手段により、各色対応する投影画像ごとに、原投影画像と、その原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミングまたはほぼ同タイミングにてモノクロセンサで取り込んだものとを対比してそれらの相違点が検出され、検出された相違点に基づいて投影手段の異常が検出される。

【００３３】

これにより、原投影画像と、その原投影画像の投影タイミングと同タイミングまたはほぼ同タイミングにて取り込まれた実投影画像とを対比してそれらの相違点に基づいて投影手段の異常を検出し、また各色対応する投影画像ごとに投影手段の異常を検出するので、投影画面に現れる表示上の不具合を各色ごと比較的正確に検出することができるという効果が得られる。

【００３４】

また、異なる複数色の画像をそれぞれ分けて表示し、画像取込手段にて取り込むことにより、一つのセンサ（モノクロセンサ）にてそれぞれの色の光学系の異常を検出することが可能となる。その結果、安価なセンサにて異常検出手段を実現することができるという効果も得られる。

〔発明１３〕　さらに、発明１３の投影装置の監視システムは、発明９の投影装置の監視システムにおいて、

前記原投影画像は、異なる複数色の原投影画像からなり、

前記実投影画像は、前記各色原投影画像に基づいてそれぞれ投影された前記複数色の実投影画像を合成してなり、

前記画像取込手段は、前記各色実投影画像を取込可能となるように前記各色実投影画像に対応させて設けたモノクロセンサであり、

前記異常検出手段は、前記各色対応する投影画像ごとに、前記投影手段に入力される信号であって前記原投影画像を構成可能な投影画像信号と、前記モノクロセンサから出力される信号であって当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミングまたはほぼ同タイミングにて前記モノクロセンサで取り込んだものを構成可能な取込画像信号とを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする。

【００３５】

このような構成であれば、モノクロセンサにより、各色実投影画像が取り込まれる。そして、異常検出手段により、各色対応する投影画像ごとに、原投影画像を構成可能な投影画像信号と、その原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミングまたはほぼ同タイミングにてモノクロセンサで取り込んだものを構成可能な取込画像信号とを対比してそれらの相違点が検出され、検出された相違点に基づいて投影手段の異常が検出される。

【００３６】

これにより、原投影画像を構成可能な投影画像信号と、その原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミングまたはほぼ同タイミングにて取り込んだものを構成可能な取込画像信号とを対比してそれらの相違点に基づいて投影手段の異常を検出し、また各色対応する投影画像ごとに投影手段の異常を検出するので、投影画面に現れる表示上の不具合を各色ごと比較的正確に検出することができるという効果が得られる。

【００３７】

また、モノクロセンサの出力を画像信号のまま比較することにより、安価なセンサと安価な回路にて異常を検出することができるという効果も得られる。

〔発明１４〕　さらに、発明１４の投影装置の監視システムは、発明１２および１３のいずれかの投影装置の監視システムにおいて、

前記投影手段は、投影画像信号または投影画像情報に基づいて画像を表示する画像表示手段と、前記画像表示手段で表示した画像を光の照射によりスクリーンに投影する光源とを含み、

【００４５】
〔発明１７〕　さらに、発明１７の投影装置の監視システムは、発明２ないし１６のいずれかの投影装置の監視システムにおいて、
前記異常検出手段は、前記実投影画像のうち複数の検査位置について、前記実投影画像のうち当該検査位置の画素値と、前記実投影画像のうち当該検査位置と隣接した位置の画素値との差分を算出し、算出した差分の総和が所定閾値を超えたときは、前記投影手段が異常であると判定するようになっていることを特徴とする。
【００４６】
このような構成であれば、異常検出手段により、実投影画像のうち複数の検査位置について、実投影画像のうち検査位置の画素値と、実投影画像のうち検査位置と隣接した位置の画素値との差分が算出され、算出された差分の総和が所定閾値を超えると、投影手段が異常であると判定される。
これにより、複数の検査位置について算出した隣接画素同士の差分の総和に基づいて投影手段の異常を検出するので、投影画面に現れる表示上の不具合を比較的正確に検出することができるという効果が得られる。
【００４７】
また、検査位置の画素値と隣接した位置の画素値とを比較することにより、投影画像の位置づれを吸収することが可能となり、誤った異常検出を防ぐことができるという効果も得られる。
また、ある画像領域において位置により徐々に変化しているような異常を検出することができるという効果も得られる。
【００４８】
〔発明１８〕　さらに、発明１８の投影装置の監視システムは、発明１５ないし１７のいずれかの投影装置の監視システムにおいて、
前記画素値は、基準時刻ｔから所定間隔Δｔごとに Ｎ（Ｎは１以上の整数）回にわたって同位置の画素値をサンプリングし、サンプリングした画素値を加算したものであることを特徴とする。
【００４９】
このような構成であれば、基準時刻ｔから所定間隔Δｔごとに Ｎ回にわたって同位置の画素値がサンプリングされ、サンプリングされた画素値が加算される。そして、異常検出手段により、その加算結果となる画素値に基づいて差分が算出される。
これにより、同位置の画素値をＮ回サンプリングするので、動作中に異常が発生した場合であっても、検出することができるという効果が得られる。
【００５０】
〔発明１９〕　さらに、発明１９の投影装置の監視システムは、発明２ないし１８のいずれかの投影装置の監視システムにおいて、
前記投影手段および前記画像取込手段に同一のタイミング信号を入力し、前記タイミング信号に基づいて、前記投影手段の投影タイミングと前記画像取込手段の取込タイミングとを同期させるようになっていることを特徴とする。
【００５１】
このような構成であれば、投影手段および画像取込手段に同一のタイミング信号が入力され、そのタイミング信号に基づいて、投影手段の投影タイミングと画像取込手段の取込タイミングとが同期する。
これにより、投影手段の投影タイミングと画像取込手段の取込タイミングとを同期させられるので、原投影画像に対応する実投影画像を取り込むことが可能となり、投影画面に現れる表示上の不具合を比較的正確に検出することができるという効果が得られる。
【００５２】
また、同一のタイミング信号にて画像の投影と、画像の取り込みとを行うため、論理的に同一の画像を比較することが可能となり、安価な回路での比較を実現することができるという効果も得られる。

【００５８】
また、異常情報を蓄えることにより、過去の情報から異常原因を比較的正確に突き止めることができるという効果も得られる。
〔発明２３〕　さらに、発明２３の投影装置は、発明２０乃至２２のいずれかの投影装置において、
前記投影手段は、投影画像信号又は投影画像情報に基づいてスクリーンに画像を投影するようになっており、
前記原投影画像は、前記投影画像信号又は前記投影画像情報により構成される画像であることを特徴とする。
【００５９】
このような構成であれば、投影装置では、投影手段により、投影画像信号または投影画像情報に基づいてスクリーンに画像が投影される。そして、画像取込手段により、投影手段で投影された実投影画像が取り込まれ、異常検出手段により、投影画像信号または投影画像情報により構成される原投影画像と、取り込まれた実投影画像とに基づいて投影手段の異常が検出される。
【００６０】
これにより、発明３に記載の投影装置の監視システムと同等の効果が得られる。
ここで、投影画像情報とは、色合成された結果色であって、人が直接見ることのできる画像である。また、投影画像信号とは、ライトバルブに入力されるＲＧＢ分割された信号である。また、投影画像信号には、描画のための同期信号も含まれます。
〔発明２４〕　さらに、発明２４の投影装置は、発明２０乃至２３のいずれかの投影装置において、
前記画像取込手段は、１次元ラインセンサであることを特徴とする。
【００６１】
このような構成であれば、１次元ラインセンサにより、投影手段で投影された実投影画像からライン画像が取り込まれる。
これにより、発明５に記載の投影装置の監視システムと同等の効果が得られる。
〔発明２５〕　さらに、発明２５の投影装置は、発明２４の投影装置において、
前記１次元ラインセンサは、前記実投影画像から水平方向のライン画像を取り込むようになっていることを特徴とする。
【００６２】
このような構成であれば、１次元ラインセンサにより、投影手段で投影された実投影画像から水平方向のライン画像が取り込まれる。通常、線欠陥は、実投影画像の垂直方向および水平方向に発生するが、初期不良の線欠陥を除いては、垂直方向の線欠陥が発生する可能性が高い。そのため、水平方向のライン画像を取り込むことにより、垂直方向の線欠陥を検出することが可能となる。
【００６３】
これにより、発明６に記載の投影装置の監視システムと同等の効果が得られる。
〔発明２６〕　さらに、発明２６の投影装置は、発明２０乃至２３のいずれかの投影装置において、
前記画像取込手段は、２次元エリアセンサであることを特徴とする。
このような構成であれば、２次元エリアセンサにより、投影手段で投影された実投影画像からエリア画像が取り込まれる。
【００６４】
これにより、発明７に記載の投影装置の監視システムと同等の効果が得られる。
〔発明２７〕　さらに、発明２７の投影装置は、発明２０乃至２６のいずれかの投影装置において、
前記所定の通知は、前記投影手段の異常に関する異常情報及び前記投影装置のイベントログを含むことを特徴とする。
【００６５】

し、検出した相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする。

【００７２】

このような構成であれば、モノクロセンサにより、各色実投影画像が取り込まれる。そして、異常検出手段により、各色対応する投影画像ごとに、原投影画像と、その原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミングまたはほぼ同タイミングにてモノクロセンサで取り込んだものとを対比してそれらの相違点が検出され、検出された相違点に基づいて投影手段の異常が検出される。

【００７３】

これにより、発明１２に記載の投影装置の監視システムと同等の効果が得られる。

〔発明３２〕　さらに、発明３２の投影装置は、発明２８の投影装置において、

前記原投影画像は、異なる複数色の原投影画像からなり、

前記実投影画像は、前記各色原投影画像に基づいてそれぞれ投影された前記複数色の実投影画像を合成してなり、

前記画像取込手段は、前記各色実投影画像を取込可能となるように前記各色実投影画像に対応させて設けたモノクロセンサであり、

前記異常検出手段は、前記各色対応する投影画像ごとに、前記投影手段に入力される信号であって前記原投影画像を構成可能な投影画像信号と、前記モノクロセンサから出力される信号であって当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミング又はほぼ同タイミングにて前記モノクロセンサで取り込んだものを構成可能な取込画像信号とを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする。

【００７４】

このような構成であれば、モノクロセンサにより、各色実投影画像が取り込まれる。そして、異常検出手段により、各色対応する投影画像ごとに、原投影画像を構成可能な投影画像信号と、その原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミングまたはほぼ同タイミングにてモノクロセンサで取り込んだものを構成可能な取込画像信号とを対比してそれらの相違点が検出され、検出された相違点に基づいて投影手段の異常が検出される。

【００７５】

これにより、発明１３に記載の投影装置の監視システムと同等の効果が得られる。

〔発明３３〕　さらに、発明３３の投影装置は、発明３１及び３２のいずれかの投影装置において、

前記投影手段は、投影画像信号又は投影画像情報に基づいて画像を表示する画像表示手段と、前記画像表示手段で表示した画像を光の照射によりスクリーンに投影する光源とを含み、

前記異常検出手段は、前記各色対応する投影画像ごとに所定閾値を超えたときには、前記光源が異常であると判定するようになっていることを特徴とする。

【００７６】

このような構成であれば、投影装置では、画像表示手段により、投影画像信号または投影画像情報に基づいて画像が表示され、表示された画像が光源からの光の照射によりスクリーンに投影される。すなわち、各色実投影画像は、１つの光源からの光の照射により投影され、それらが合成されてスクリーンに投影されるため、各色実投影画像すべてに異常がある場合は、光源に異常がある可能性が高い。したがって、各色対応する投影画像ごとに所定範囲を超える相違点が検出されると、異常検出手段により、光源が異常であると判定される。

【００７７】

これにより、発明１４に記載の投影装置の監視システムと同等の効果が得られる。

〔発明３４〕　さらに、発明３４の投影装置は、発明２０乃至３３のいずれかの投影装置において、

タイミングとが同期する。
これにより、発明１９に記載の投影装置の監視システムと同等の効果が得られる。
〔発明３９〕　一方、上記目的を達成するために、発明３９の投影装置の監視プログラムは、
画像を投影する投影手段を有する投影装置を監視するプログラムであって、
前記投影手段で投影した実投影画像を取り込み、取り込んだ実投影画像に基づいて前記投影手段の異常を検出する処理をコンピュータに実行させるためのプログラムであることを特徴とする。
【００８４】
このような構成であれば、コンピュータによってプログラムが読み取られ、読み取られたプログラムに従ってコンピュータが処理を実行すると、発明１の投影装置の監視システムと同等の作用及び効果が得られる。
〔発明４０〕　さらに、発明４０の投影装置の監視プログラムは、
画像を投影する投影手段を有しかつコンピュータからなる投影装置に実行させるためのプログラムであって、
前記投影手段で投影した実投影画像を取り込む画像取込手段、前記画像取込手段で取り込んだ実投影画像に基づいて前記投影手段の異常を検出する異常検出手段、および前記異常検出手段で異常を検出したときに所定の通知を行う異常通知手段として実現される処理を実行させるためのプログラムであり、
前記異常検出手段は、前記投影手段で投影すべき原投影画像と、前記画像取込手段で取り込んだ実投影画像とに基づいて前記投影手段の異常を検出するようになっていることを特徴とする。
【００８５】
このような構成であれば、コンピュータによってプログラムが読み取られ、読み取られたプログラムに従ってコンピュータが処理を実行すると、発明２０の投影装置と同等の作用及び効果が得られる。
ここで、投影手段とは、画像を生成し、当該画像を投射するための機構で、光源、ライトバルブ（例えば、液晶、ＤＭＤ、ＬＣＯＳ等を使用したもの）、レンズ、パネルのドライバを含むものであり、投影装置とは、その投影手段を兼ね備えたものである。
【００８６】
〔発明４１〕　さらに、発明４１の投影装置の監視プログラムは、発明４０の投影装置の監視プログラムにおいて、
監視センタと通信可能に接続し、
前記異常通知手段は、前記異常検出手段で異常を検出したときは、前記監視センタに対して所定の通知を行うようになっていることを特徴とする。
【００８７】
このような構成であれば、コンピュータによってプログラムが読み取られ、読み取られたプログラムに従ってコンピュータが処理を実行すると、発明２１の投影装置と同等の作用及び効果が得られる。
〔発明４２〕　さらに、発明４２の投影装置の監視プログラムは、
監視センタと通信可能に接続し、画像を投影する投影手段を有しかつコンピュータからなる投影装置に実行させるためのプログラムであって、
前記投影手段で投影した実投影画像を取り込む画像取込手段、前記画像取込手段で取り込んだ実投影画像に基づいて前記投影手段の異常を検出する異常検出手段、および前記異常検出手段での異常検出結果を前記監視センタからのアクセスに応じて提供する検出結果提供手段として実現される処理を実行させるためのプログラムであり、
前記異常検出手段は、前記投影手段で投影すべき原投影画像と、前記画像取込手段で取り込んだ実投影画像とに基づいて前記投影手段の異常を検出するようになっており、
前記検出結果提供手段は、前記異常検出手段での異常検出結果を保存し、前記監視センタからのアクセスがあったときは、前記保存している異常検出結果を前記監視センタに提

【００９４】
〔発明４８〕　さらに、発明４８の投影装置の監視プログラムは、発明４０乃至４７のいずれかの投影装置の監視プログラムにおいて、
前記異常検出手段は、前記原投影画像と前記実投影画像とを対比してそれらの一致点又は相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする。
このような構成であれば、コンピュータによってプログラムが読み取られ、読み取られたプログラムに従ってコンピュータが処理を実行すると、発明２８の投影装置と同等の作用及び効果が得られる。
【００９５】
〔発明４９〕　さらに、発明４９の投影装置の監視プログラムは、発明４８の投影装置の監視プログラムにおいて、
前記異常検出手段は、前記原投影画像と、当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミング又はほぼ同タイミングにて前記画像取込手段で取り込んだものとを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする。
【００９６】
このような構成であれば、コンピュータによってプログラムが読み取られ、読み取られたプログラムに従ってコンピュータが処理を実行すると、発明２９の投影装置と同等の作用及び効果が得られる。
〔発明５０〕　さらに、発明５０の投影装置の監視プログラムは、発明４８の投影装置の監視プログラムにおいて、
前記異常検出手段は、前記投影手段に入力される信号であって前記原投影画像を構成可能な投影画像信号と、前記画像取込手段から出力される信号であって当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミング又はほぼ同タイミングにて前記画像取込手段で取り込んだものを構成可能な取込画像信号とを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする。
【００９７】
このような構成であれば、コンピュータによってプログラムが読み取られ、読み取られたプログラムに従ってコンピュータが処理を実行すると、発明３０の投影装置と同等の作用及び効果が得られる。
〔発明５１〕　さらに、発明５１の投影装置の監視プログラムは、発明４８の投影装置の監視プログラムにおいて、
前記原投影画像は、異なる複数色の原投影画像からなり、
前記実投影画像は、前記各色原投影画像に基づいてそれぞれ投影された前記複数色の実投影画像を合成してなり、
前記画像取込手段は、前記各色実投影画像を取込可能となるように前記各色実投影画像に対応させて設けたモノクロセンサを利用して前記各色実投影画像を取り込み、
前記異常検出手段は、前記各色対応する投影画像ごとに、前記原投影画像と、当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミング又はほぼ同タイミングにて前記モノクロセンサで取り込んだものとを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出するようになっていることを特徴とする。
【００９８】
このような構成であれば、コンピュータによってプログラムが読み取られ、読み取られたプログラムに従ってコンピュータが処理を実行すると、発明３１の投影装置と同等の作用及び効果が得られる。
〔発明５２〕　さらに、発明５２の投影装置の監視プログラムは、発明４８の投影装置の監視プログラムにおいて、
前記原投影画像は、異なる複数色の原投影画像からなり、

【０１０３】
このような構成であれば、コンピュータによってプログラムが読み取られ、読み取られたプログラムに従ってコンピュータが処理を実行すると、発明３６の投影装置と同等の作用及び効果が得られる。
〔発明５７〕　さらに、発明５７の投影装置の監視プログラムは、発明５４乃至５６のいずれかの投影装置の監視プログラムにおいて、
前記画素値は、基準時刻ｔから所定間隔Δｔごとに Ｎ（Ｎは１以上の整数）回にわたって同位置の画素値をサンプリングし、サンプリングした画素値を加算したものであることを特徴とする。
【０１０４】
このような構成であれば、コンピュータによってプログラムが読み取られ、読み取られたプログラムに従ってコンピュータが処理を実行すると、発明３７の投影装置と同等の作用及び効果が得られる。
〔発明５８〕　さらに、発明５８の投影装置の監視プログラムは、発明４０乃至５７のいずれかの投影装置の監視プログラムにおいて、
前記画像取込手段は、前記投影手段が入力するタイミング信号と同一の信号を入力し、前記タイミング信号に基づいて、前記投影手段の投影タイミングと前記実投影画像を取り込む取込タイミングとを同期させることを特徴とする。
【０１０５】
このような構成であれば、コンピュータによってプログラムが読み取られ、読み取られたプログラムに従ってコンピュータが処理を実行すると、発明３８の投影装置と同等の作用及び効果が得られる。
〔発明５９〕　一方、上記目的を達成するために、発明５９の投影装置の監視方法は、
画像を投影する投影手段を有する投影装置を監視する方法であって、
前記投影手段で投影した実投影画像を取り込み、取り込んだ実投影画像に基づいて前記投影手段の異常を検出することを特徴とする。
【０１０６】
これにより、発明１の投影装置の監視システムと同等の効果が得られる。
〔発明６０〕　さらに、発明６０の投影装置の監視方法は、
画像を投影する投影手段を有する投影装置を監視する方法であって、
前記投影手段で投影した実投影画像を取り込む画像取込ステップと、前記画像取込ステップで取り込んだ実投影画像に基づいて前記投影手段の異常を検出する異常検出ステップと、前記異常検出ステップで異常を検出したときに所定の通知を行う異常通知ステップとを含み、
前記異常検出ステップは、前記投影手段で投影すべき原投影画像と、前記画像取込ステップで取り込んだ実投影画像とに基づいて前記投影手段の異常を検出することを特徴とする。
【０１０７】
これにより、発明２０の投影装置と同等の効果が得られる。
ここで、投影手段とは、画像を生成し、当該画像を投射するための機構で、光源、ライトバルブ（例えば、液晶、ＤＭＤ、ＬＣＯＳ等を使用したもの）、レンズ、パネルのドライバを含むものであり、投影装置とは、その投影手段を兼ね備えたものである。
〔発明６１〕　さらに、発明６１の投影装置の監視方法は、発明６０の投影装置の監視方法において、
監視センタと通信可能に接続し、
前記異常通知ステップは、前記異常検出ステップで異常を検出したときは、前記監視センタに対して所定の通知を行うことを特徴とする。
【０１０８】
これにより、発明２１の投影装置と同等の効果が得られる。
〔発明６１〕　さらに、発明６１の投影装置の監視方法は、

前記異常検出ステップは、前記原投影画像と前記実投影画像とを対比してそれらの一致点又は相違点に基づいて前記投影手段の異常を検出することを特徴とする。

【０１１５】

これにより、発明２８の投影装置と同等の効果が得られる。

〔発明６９〕　さらに、発明６９の投影装置の監視方法は、発明６８の投影装置の監視方法において、

前記異常検出ステップは、前記原投影画像と、当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミング又はほぼ同タイミングにて前記画像取込ステップで取り込んだものとを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出することを特徴とする。

【０１１６】

これにより、発明２９の投影装置と同等の効果が得られる。

〔発明７０〕　さらに、発明７０の投影装置の監視方法は、発明６８の投影装置の監視方法において、

前記異常検出ステップは、前記投影手段に入力される信号であって前記原投影画像を構成可能な投影画像信号と、前記画像取込ステップにおいて出力される信号であって当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミング又はほぼ同タイミングにて前記画像取込ステップで取り込んだものを構成可能な取込画像信号とを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出することを特徴とする。

【０１１７】

これにより、発明３０の投影装置と同等の効果が得られる。

〔発明７１〕　さらに、発明７１の投影装置の監視方法は、発明６８の投影装置の監視方法において、

前記原投影画像は、異なる複数色の原投影画像からなり、

前記実投影画像は、前記各色原投影画像に基づいてそれぞれ投影された前記複数色の実投影画像を合成してなり、

前記画像取込ステップは、前記各色実投影画像を取込可能となるように前記各色実投影画像に対応させて設けたモノクロセンサを利用して前記各色実投影画像を取り込み、

前記異常検出ステップは、前記各色対応する投影画像ごとに、前記原投影画像と、当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミング又はほぼ同タイミングにて前記モノクロセンサで取り込んだものとを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出することを特徴とする。

【０１１８】

これにより、発明３１の投影装置と同等の効果が得られる。

〔発明７２〕　さらに、発明７２の投影装置の監視方法は、発明６８の投影装置の監視方法において、

前記原投影画像は、異なる複数色の原投影画像からなり、

前記実投影画像は、前記各色原投影画像に基づいてそれぞれ投影された前記複数色の実投影画像を合成してなり、

前記画像取込ステップは、前記各色実投影画像を取込可能となるように前記各色実投影画像に対応させて設けたモノクロセンサを利用して前記各色実投影画像を取り込み、

前記異常検出ステップは、前記各色対応する投影画像ごとに、前記投影手段に入力される信号であって前記原投影画像を構成可能な投影画像信号と、前記モノクロセンサから出力される信号であって当該原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミング又はほぼ同タイミングにて前記モノクロセンサで取り込んだものを構成可能な取込画像信号とを対比してそれらの相違点を検出し、検出した相違点に基づいて前記投影手段の異常を検出することを特徴とする。

【０１１９】

これにより、発明３２の投影装置と同等の効果が得られる。

本実施の形態は、本発明に係る投影装置の監視システム、投影装置および投影装置の監視プログラム、並びに投影装置の監視方法を、図１に示すように、投影装置１００において発生した異常を検出し、監視センタ２００に通知する場合について適用したものである。

【０１２７】

まず、本発明を適用するネットワークシステムの構成を図１を参照しながら説明する。図１は、本発明を適用するネットワークシステムの構成を示すブロック図である。

インターネット１９９には、図１に示すように、スクリーン１１０に画像を投影する投影装置１００と、投影装置１００を監視する監視センタ２００とが接続されている。なお、発明の理解を容易にするため、投影装置１００を１台しか図示していないが、実際には、複数の投影装置１００がインターネット１９９に接続されている。

【０１２８】

次に、投影装置１００の構成を図２を参照しながら詳細に説明する。図２は、投影装置１００の構成を示すブロック図である。

投影装置１００は、図２に示すように、図示しないＰＣ等から与えられる投影画像信号に基づいてスクリーン１１０に画像を投影する投影部１２０と、スクリーン１１０に投影された投影画像を取り込む撮像素子１３０と、投影画像信号および撮像素子１３０からの撮像信号に基づいて投影部１２０の異常を検出する異常検出部１４０と、異常検出部１４０で異常を検出したときに所定の通知を行う通知部１５０とで構成されている。なお、以下、投影画像信号により構成される理想的な投影画像を原投影画像といい、スクリーン１１０に実際に投影された投影画像を実投影画像といい、それらを区別するものとする。

【０１２９】

ここで、投影部１２０の異常とは、ランプ切れ、ライトバルブの点欠陥、ライトバルブの線欠陥、色むら、光量むら、ランプの劣化等を示す。

次に、投影部１２０の内部構造を図３および図４を参照しながら詳細に説明する。図３は、投影部１２０の内部構造を示す平面図である。図４は、投影部１２０の内部構造を示す側面図である。

【０１３０】

図３および図４において、ハロゲン電球やメタルハライド電球と反射板にて構成された光源２０より発した可視光は、レンズ２１、熱線カットフィルタ２２、反射鏡２３、およびレンズ２４にて構成される光学系において集光され、ほぼ平行光としての可視光を得る。光源２０より発生する熱量は放熱ファン３４にて強制排出される。

照明光学系より照射される可視光はダイクロイックミラーにより赤色・緑色・青色の三原色に分光される。実施例では青反射ミラー２５により青色が分光され、青反射ミラー２８を経て青表示パネル３１を照明する。赤反射ミラー２６により赤色が分光され、赤表示パネル３２を照明する。残った緑色の光は緑表示パネル３３を照明する。緑表示パネル３３に表示される画像は、緑反射ミラー２７および緑反射ミラー３０を経て投影レンズ１３に至り、赤表示パネル３２の表示画像は赤反射ミラー２９を経て投影レンズ１３に至る。青表示パネル３１の表示画像は赤反射ミラー２９および緑反射ミラー３０を透過して投影レンズ１３に至る。

【０１３１】

３枚の表示パネルは投影レンズ１３からの光学距離が同一になるよう配置されており、ダイクロイックミラーによりそれぞれの表示画像は投影レンズ１３において合成され、拡大投影される。

３５は脚であり投影角度の調節を行う。３６は回路部であり、コントロール回路および電源回路が配置される。

【０１３２】

ここで、撮像素子１３０が取り付けられる位置は、撮像素子１３０によって取り込まれる実投影画像の形状が、投影部１２０で投影された実投影画像を取り込む角度によって変化することから、実投影画像の形状を変化させないようにするために、投影レンズ１３の

$$\Delta P_{1r} = | P_1(X, Y) - P_r(X, Y) | \quad \cdots (2)$$

次いで、ステップＳ１１４に移行して、変数ΔP_{1r}の値が閾値P_{th1}よりも大きいか否かを判定し、変数ΔP_{1r}の値が閾値P_{th1}以下であると判定したとき(No)は、ステップＳ１１６に移行して、下式（３）により、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の積算値$P_r(X, Y, t)$と、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置と隣接した位置の積算値$P_r(X-1, Y, t)$との差分を算出し、算出した差分を変数ΔP_{r1}に格納する。

$$\Delta P_{r1} = | P_r(X, Y, t) - P_r(X-1, Y, t) | \quad \cdots (3)$$

次いで、ステップＳ１１８に移行して、変数ΔP_{r1}の値が閾値P_{th2}よりも大きいか否かを判定する。

【０１３８】

ここで、隣接した位置の積算値P_rとして、$P_r(X-1, Y, t)$を例に挙げて、変数ΔP_{r1}を説明している。隣接した位置の積算値P_rとしては、$P_r(X-1, Y, t)$、$P_r(X+1, Y, t)$、$P_r(X, Y-1, t)$、$P_r(X, Y+1, t)$、$P_r(X-1, Y-1, t)$、$P_r(X+1, Y-1, t)$、$P_r(X-1, Y+1, t)$、及び$P_r(X+1, Y+1, t)$の８個の隣接した位置の積算値P_rが考えられることから、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の積算値$P_r(X, Y, t)$と、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置と隣接した８個の位置の積算値P_rとの差分をそれぞれ算出し、算出したそれぞれの差分を変数ΔP_{r1}に格納し、格納したそれぞれの変数ΔP_{r1}に対して、変数ΔP_{r1}の値が閾値P_{th2}よりも大きいか否かを判定する。または、８個のうちの所定の隣接した位置の積算値P_rに対して、変数ΔP_{r1}を算出し、判定する。

【０１３９】

変数ΔP_{r1}の値が閾値P_{th2}以下であると判定したとき(No)は、ステップＳ１２０に移行して、下式（４）により、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の積算値$P_r(X, Y, t)$と、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置とは離隔した位置の積算値$P_r(X-k, Y, t)$との差分を算出し、算出した差分を変数ΔP_{r2}に格納する。

$$\Delta P_{r2} = | P_r(X, Y, t) - P_r(X-k, Y, t) | \quad \cdots (4)$$

次いで、ステップＳ１２２に移行して、変数ΔP_{r2}の値が閾値P_{th3}よりも大きいか否かを判定する。ここで、ｋは、２以上の値であり、且つ、水平方向画素数及び垂直方向画素数のうち大きいほうの値の１／１００以下の整数値とする。

【０１４０】

また、ここで、離隔した位置の積算値P_rとして、$P_r(X-k, Y, t)$を例に挙げて、変数ΔP_{r2}を説明している。離隔した位置の積算値P_rとしては、$P_r(X-k, Y, t)$、$P_r(X+k, Y, t)$、$P_r(X, Y-k, t)$、$P_r(X, Y+k, t)$、$P_r(X-k, Y-k, t)$、$P_r(X+k, Y-k, t)$、$P_r(X-k, Y+k, t)$、及び$P_r(X+k, Y+k, t)$の８個の離隔した位置の積算値P_rが考えられることから、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の積算値$P_r(X, Y, t)$と、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置と離隔した８個の位置の積算値P_rとの差分をそれぞれ算出し、算出したそれぞれの差分を変数ΔP_{r2}に格納し、格納したそれぞれの変数ΔP_{r2}に対して、変数ΔP_{r2}の値が閾値P_{th3}よりも大きいか否かを判定する。または、８個のうちの所定の離隔した位置の積算値P_rに対して、変数ΔP_{r2}を算出し、判定する。

【０１４１】

また、撮像素子１３０により、投影部１２０で投影された実投影画像からエリア画像が取り込まれ、取り込まれた実投影画像を構成可能な撮像信号が異常検出部１４０に出力される。この取込タイミングは、タイミング信号に基づいて決定される。このとき、同タイミング信号が投影部１２０にも入力されているので、投影部１２０の投影タイミングと撮像素子１３０の取込タイミングとが同期することとなる。

【０１４７】

次いで、異常検出部１４０では、投影画像信号および撮像信号が入力されると、まず、ステップＳ１０２，Ｓ１０４を経て、入力された投影画像信号に基づいて原投影画像が構成され、構成された原投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の画素値がサンプリングされ、サンプリングされた画素値が変数P_l（Ｘ，Ｙ）に格納される。また、ステップＳ１０６，Ｓ１０８を経て、入力された撮像信号に基づいて実投影画像が構成され、構成された実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の画素値がサンプリングされ、サンプリングされた画素値が変数P_r（Ｘ，Ｙ）に格納される。そして、ステップＳ１１０を経て、上式（１）により、現在時刻ｔから過去に向けてΔｔごとにＮ回にわたって、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の画素値が加算され、算出された積算値が変数P_r（Ｘ，Ｙ，ｔ）に格納される。

【０１４８】

このように、検査位置の画素値P_l（Ｘ，Ｙ）およびP_r（Ｘ，Ｙ）がサンプリングされ、検査位置の積算値P_r（Ｘ，Ｙ，ｔ）が算出されると、ステップＳ１１２，Ｓ１１４を経て、第１の異常検出処理が実行される。第１の異常検出処理では、まず、上式（２）により、原投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の画素値P_l（Ｘ，Ｙ）と、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の画素値P_r（Ｘ，Ｙ）との差分が算出され、算出された差分が変数ΔP_{lr}に格納される。そして、変数ΔP_{lr}の値が閾値P_{th1}よりも大きいと、投影部１２０が異常であると判定されるので、ステップＳ１４６を経て、原投影画像と実投影画像とを対比して所定範囲を超える相違点がある旨を示す異常信号が通知部１５０に出力される。第１の異常検出処理により、実投影画像に線欠陥が発生している場合はその異常を検出することができる。

【０１４９】

通知部１５０では、異常信号が入力されると、投影部１２０が異常である旨の通知、入力された異常信号の内容を示す異常情報、および投影装置１００のイベントログが監視センタ２００に送信される。

また、投影装置１００では、第１の異常検出処理で異常が検出されない場合には、ステップＳ１１６，Ｓ１１８を経て、第２の異常検出処理が実行される。第２の異常検出処理では、まず、上式（３）により、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の積算値P_r（Ｘ，Ｙ，ｔ）と、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置と隣接した位置の積算値P_r（Ｘ－１，Ｙ，ｔ）との差分が算出され、算出された差分が変数ΔP_{r1}に格納される。そして、変数ΔP_{r1}の値が閾値P_{th2}よりも大きいと、投影部１２０が異常であると判定されるので、ステップＳ１４４を経て、実投影画像において隣接画素同士の積算値の差分が異常である旨を示す異常信号が通知部１５０に出力される。第２の異常検出処理により、実投影画像に線欠陥が発生している場合、または実投影画像に色むらが発生している場合はその異常を検出することができる。なお、通知部１５０以降の処理については、上記同様である。

【０１５０】

また、投影装置１００では、第２の異常検出処理で異常が検出されない場合には、ステップＳ１２０，Ｓ１２２を経て、第３の異常検出処理が実行される。第３の異常検出処理では、まず、上式（４）により、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の積算値P_r（Ｘ，Ｙ，ｔ）と、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置とは離隔した位置の積算値P_r（Ｘ－ｋ，Ｙ，ｔ）との差分が算出され、算出された差分が変数ΔP_{r2}に格納される。そして、変数ΔP_{r2}の値が閾値P_{th3}よりも大きいと、投影部１２０が異常であると判定されるので、ステップＳ１４２を経て、実投影画像

これにより、所定の通知により、投影部１２０に異常が発生したことのほか、投影部１２０の異常に関する異常情報および投影装置１００の稼動履歴を把握することができる。

【０１５６】

さらに、本実施の形態では、異常検出部１４０は、原投影画像と実投影画像とを対比してそれらの相違点に基づいて投影部１２０の異常を検出するようになっている。

これにより、投影画面に現れる表示上の不具合をさらに詳細なレベルで検出することができる。

さらに、本実施の形態では、異常検出部１４０は、原投影画像と、その原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミングまたはほぼ同タイミングにて撮像素子１３０で取り込んだものとを対比してそれらの相違点を検出し、検出した相違点に基づいて投影部１２０の異常を検出するようになっている。

【０１５７】

これにより、投影画面に現れる表示上の不具合を比較的正確に検出することができる。

さらに、本実施の形態では、異常検出部１４０は、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の積算値P_r（Ｘ，Ｙ，ｔ）と、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置と隣接した位置の積算値P_r（Ｘ－１，Ｙ，ｔ）との差分ΔP_{r1}を算出し、算出した差分ΔP_{r1}が所定閾値P_{th2}を超えたときは、投影部１２０が異常であると判定するようになっている。

【０１５８】

これにより、隣接画素同士の差分に基づいて投影部１２０の異常を検出するので、投影画面に現れる表示上の不具合をさらに正確に検出することができる。

さらに、本実施の形態では、異常検出部１４０は、変数ΔP_{r1}の総和を算出し、算出した総和が所定閾値P_{th4}を超えたときは、投影部１２０が異常であると判定するようになっている。

【０１５９】

これにより、複数の検査位置について算出した隣接画素同士の差分の総和に基づいて投影部１２０の異常を検出するので、投影画面に現れる表示上の不具合をさらに正確に検出することができる。

さらに、本実施の形態では、投影部１２０および撮像素子１３０に同一のタイミング信号を入力し、タイミング信号に基づいて、投影部１２０の投影タイミングと撮像素子１３０の取込タイミングとを同期させるようになっている。

【０１６０】

これにより、原投影画像に対応する実投影画像を取り込むことが可能となり、投影画面に現れる表示上の不具合をさらに正確に検出することができる。

上記実施の形態において、投影部１２０は、発明２ないし４、８ないし１０、１５ないし１７、１９、２０、２１、２３、２７乃至２９、３４乃至３６、３８、３９、４０、４１、４３、４７乃至４９、５４乃至５６、５８、５９、６０、６１、６３、６７乃至６９、７４乃至７６、又は７８の投影手段に対応し、撮像素子１３０は、発明２、４、７、１０、１９、２０、２１、２６、２９、３８、４０、４１、４６、４９、又は５８の画像取込手段に対応し、撮像素子１３０による取込は、発明６０、６１、６６、６９、又は７８の画像取込ステップに対応している。また、異常検出部１４０は、発明２、４、９、１０、１５ないし１７、２０、２１、２８、２９、３４乃至３６、４０、４１、４８、４９、又は５４乃至５６の異常検出手段に対応し、異常検出部１４０による検出は、発明６０、６１、６８、６９、又は７４乃至７６の異常検出ステップに対応し、通知部１５０は、発明２、４、２０、２１、４０又は４１の異常通知手段に対応している。

【０１６１】

また、上記実施の形態において、通知部１５０による通知は、発明６０又は６１の異常通知ステップに対応している。

なお、上記実施の形態においては、撮像素子１３０として２次元エリアセンサを用いて構成したが、これに限らず、１次元ラインセンサを用いて構成することもできる。通常、

４０は、発明１２、３１又は５１の異常検出手段に対応し、異常検出部１４０による検出は、発明７１の異常検出ステップに対応している。

【０１６８】

第２に、撮像素子１３０は、各色実投影画像を取込可能となるように各色実投影画像に対応させて設けたモノクロセンサであり、異常検出部１４０は、各色対応する投影画像ごとに、投影部１２０に入力される信号であって原投影画像を構成可能な投影画像信号と、モノクロセンサから出力される信号であってその原投影画像に基づいて投影された実投影画像をその投影タイミングと同タイミングまたはほぼ同タイミングにてモノクロセンサで取り込んだものを構成可能な撮像信号とを対比してそれらの相違点を検出し、検出した相違点に基づいて投影部１２０の異常を検出する。

【０１６９】

これにより、各色対応する投影画像ごとに投影部１２０の異常を検出するので、投影画面に現れる表示上の不具合をさらに正確に検出することができる。

この場合において、投影部１２０は、発明１３、３２、５２又は７２の投影手段に対応し、撮像素子１３０は、発明１３、３２又は５２の画像取込手段に対応し、撮像素子１３０による取り込みは、発明７２の画像取込ステップに対応している。また、異常検出部１４０は、発明１３、３２又は５２の異常検出手段に対応し、異常検出部１４０による検出は、発明７２の異常検出ステップに対応し、撮像信号は、発明１３、３２、５２又は７２の取込画像信号に対応している。

【０１７０】

第３に、第１および第２の構成において、異常検出部１４０は、各色対応する投影画像ごとに所定範囲を超える相違点を検出したときは、光源２０が異常であると判定する。

これにより、原投影画像と実投影画像とを対比するだけで光源２０が異常であることを検出することができる。

この場合において、投影部１２０は、発明１４、３３、５３又は７３の投影手段に対応し、異常検出部１４０は、発明１４、３３又は５３の異常検出手段に対応し、撮像素子１３０による取り込みは、発明７３の画像取込ステップに対応している。また、表示パネル３１～３３は、発明１４、３３、５３又は７３の画像表示手段に対応している。

【０１７１】

また、上記実施の形態において、通知部１５０は、異常検出部１４０からの異常信号を入力したときは、投影部１２０が異常である旨の通知、入力した異常信号の内容を示す異常情報、および投影装置１００のイベントログを監視センタ２００に送信するように構成したが、これに限らず、監視センタ２００からのアクセスに応じてそれらの情報を提供するように構成することもできる。具体的には、通知部１５０は、異常検出部１４０での異常検出結果を保存し、監視センタ２００からのアクセスがあったときは、保存している異常検出結果を監視センタ２００に提供する。

【０１７２】

このような構成であっても、上記実施の形態と同等の効果が得られる。

この場合において、投影部１２０は、発明２２、４２または６２の投影手段に対応し、撮像素子１３０は、発明２２または４２の画像取込手段に対応し、撮像素子１３０による取込は、発明６２の画像取込ステップに対応し、異常検出部１４０は、発明２２または４２の異常検出手段に対応している。また、異常検出部１４０による検出は、発明６２の異常検出ステップに対応し、通知部１５０は、発明２２または４２の検出結果提供手段に対応し、通知部１５０による通知は、発明６２の検出結果提供ステップに対応している。

【０１７３】

また、上記実施の形態において、異常検出部１４０は、原投影画像と実投影画像とを対比してそれらの相違点に基づいて投影部１２０の異常を検出するように構成したが、これに限らず、原投影画像と実投影画像とを対比してそれらの一致点に基づいて投影部１２０の異常を検出するように構成することもできる。

また、上記実施の形態において、原投影画像は、投影画像信号により構成したが、これ

また、上記実施の形態において、異常検出部１４０は、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の積算値$Ｐ_{r}$（Ｘ，Ｙ，ｔ）と、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置と隣接した位置の積算値$Ｐ_{r}$（Ｘ－１，Ｙ，ｔ）との差分$\Delta Ｐ_{r1}$を算出し、算出した差分$\Delta Ｐ_{r1}$が所定閾値$Ｐ_{th2}$を超えたときは、投影部１２０が異常であると判定するように構成したが、これに限らず、次のように構成することができる。

【０１８１】

第１に、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の積算値$Ｐ_{r}$（Ｘ，Ｙ，ｔ）と、実投影画像のうち変数Ｘ，Ｙの値により特定される検査位置の所定時間過去の積算値$Ｐ_{r}$（Ｘ，Ｙ，ｔ－ｋ）との差分を算出し、算出した差分が所定閾値を超えたときは、投影部１２０が異常であると判定する。

第２に、任意の画素に基準色を表示したときのその画素値と、過去において任意の画素に同基準色を表示したときのその画素値とを対比してそれらの相違点を検出し、検出した相違点に基づいて投影部１２０が異常であると判定する。

【０１８２】

第３に、任意の画素にある色を表示したときのその画素値と、同一画素（または画素群）の参照値とを対比してそれらの相違点を検出し、検出した相違点に基づいて投影部１２０が異常であると判定する。ここで、参照値は、ネットワークなどから入手することができる。

また、上記実施の形態においては、撮像素子１３０を一つだけ設けて構成したが、これに限らず、複数の撮像素子１３０を設け、各撮像素子１３０から取り込んだ実投影画像に基づいて投影部１２０の異常を検出するように構成することができる。

【０１８３】

これにより、投影画面に現れる表示上の不具合をさらに確実に検出することができる。

また、上記実施の形態においては、第１の異常検出処理、第２の異常検出処理、第３の異常検出処理または第４の異常検出処理で異常を検出したときは、異常信号を通知部１５０に出力するように構成したが、これに限らず、異常を検出したときは、該当の検出画素に対して再度検査を行い、それでも異常を検出したときに初めて、異常信号を通知部１５０に出力するように構成することができる。

【０１８４】

これにより、投影画面に現れる表示上の不具合をさらに確実に検出することができる。

また、上記実施の形態においては、スクリーン１１０に投影された実投影画像を取り込むように撮像素子１３０を設けて構成したが、これに限らず、投影レンズ１３上に透明素子からなる撮像素子１３０を埋め込むように構成することもできる。

これにより、投影装置１００とスクリーン１１０との間に障害が生じても、投影部１２０の異常を検出することができる。

【０１８５】

また、上記実施の形態においては、投影装置１００の内部構造として光源２０からの光を投影レンズ１３に集光するように構成したが、これに限らず、分岐路を設け、分岐先に撮像素子１３０を設けて投影部１２０の異常を検出するように構成することもできる。

これにより、投影装置１００とスクリーン１１０との間に障害が生じても、投影部１２０の異常を検出することができる。

【０１８６】

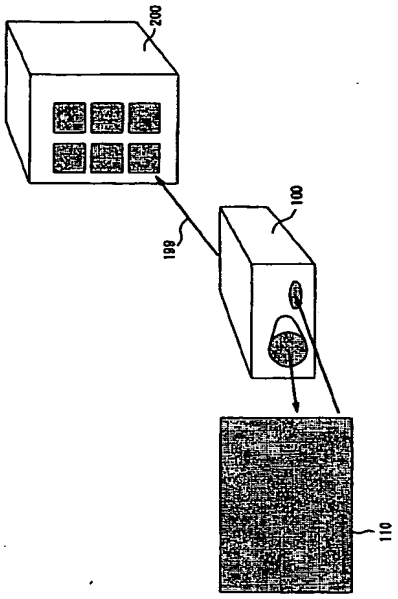
また、上記実施の形態において、異常検出部１４０は、あらかじめ定められた所定の検査項目について投影部１２０の異常を検出するように構成したが、これに限らず、監視センタ２００から検査項目を受信し、受信した検査項目について投影部１２０の異常を検出するように構成することもできる。

これにより、監視センタ２００側で異常検出サービスの内容を調整することができる。

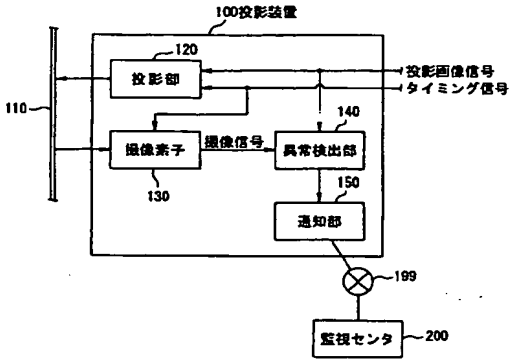
【０１８７】

また、上記実施の形態において、図５のフローチャートに示す処理を実行するにあたっ

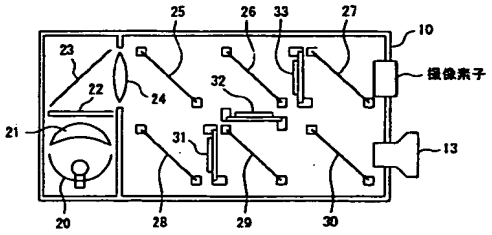
【図１】


200
100
199
110

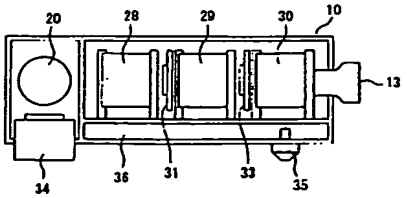
【図２】


100投影装置
120
投影部
投影画像信号
タイミング信号
110
140
撮像素子
撮像信号
異常検出部
130
150
通知部
199
監視センタ
200

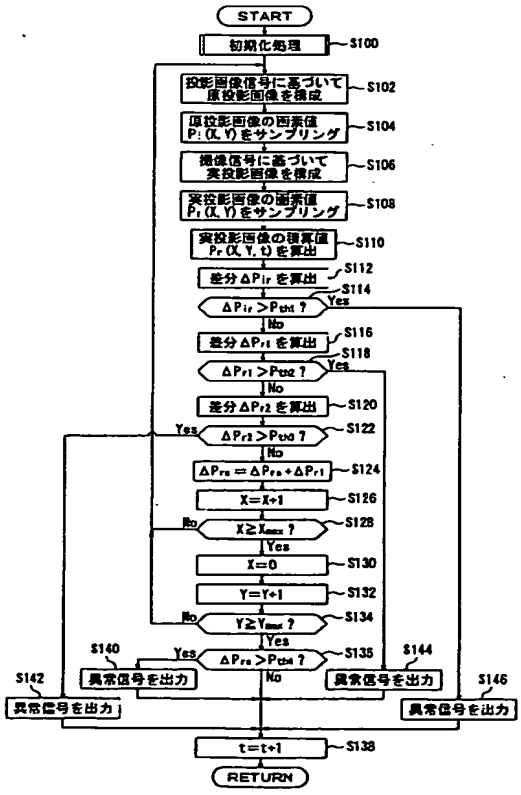
【図３】


25
26
33
27
10
23
22
24
32
撮像素子
21
31
13
20
28
29
30

【図４】


20
28
29
30
10
13
34
36
31
33
35

【図５】


START
初期化処理
S100
投影画像信号に基づいて原投影画像を構成
S102
原投影画像の画素値 Pi(X, Y) をサンプリング
S104
撮像信号に基づいて実投影画像を構成
S106
実投影画像の画素値 Pr(X, Y) をサンプリング
S108
実投影画像の領算値 Pr(X, Y, t) を算出
S110
差分 ΔPir を算出
S112
ΔPir > Pth1 ?
S114
Yes
No
差分 ΔPr1 を算出
S116
ΔPr1 > Pth2 ?
S118
Yes
No
差分 ΔPr2 を算出
S120
Yes
ΔPr2 > Pth0 ?
S122
No
ΔPre = ΔPre + ΔPr1
S124
X=X+1
S126
No
X≥Xmax ?
S128
Yes
X=0
S130
Y=Y+1
S132
No
Y≥Ymax ?
S134
Yes
S140
Yes
ΔPre > Pth4 ?
S135
S144
No
異常信号を出力
異常信号を出力
S142
異常信号を出力
S146
t=t+1
S138
RETURN

フロントページの続き

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5C058 BA35 BB25 EA00
5C060 BC05 HB00 JA00
5C061 BB05 BB09 BB13 CC05

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Patent Abstracts of Japan

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APPLICANT : SEIKO EPSON CORP;

INVENTOR : AOKI MIKIO;

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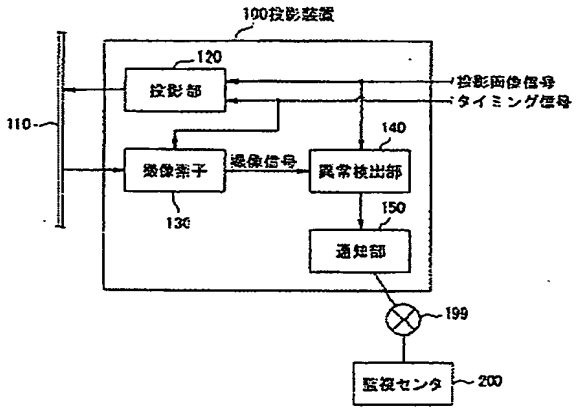
H04N 9/31

TITLE : SYSTEM FOR MONITORING PROJECTOR, PROJECTOR, PROGRAM FOR MONITORING PROJECTOR AND METHOD FOR MONITORING PROJECTOR



ABSTRACT : PROBLEM TO BE SOLVED: To provide a system for monitoring a projector suitable for detecting defects appearing on a projected display screen.

SOLUTION: The projector 100 comprises a projection unit 120 which projects an image on the screen 110, an image pick up element 130 for taking in an actual projection image projected by the projection unit 120, a defect detection unit 140 for detecting the defect in the projection unit 120 based on the actual projection image taken in by the image pickup element 130, and a notification unit 150 for performing a predetermined notification when the fault detection unit 140 detects the fault. The defect detection unit 140 detects the defect in the projection unit 120 based on an original projection image which is the image to be projected by the projection unit 120 and the actual projection image taken in by the image pick up element 130.

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : SEIKO EPSON CORP

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AOKI MIKIO

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(54) SYSTEM FOR MONITORING PROJECTOR, PROJECTOR, PROGRAM FOR MONITORING PROJECTOR AND METHOD FOR MONITORING PROJECTOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a system for monitoring a projector suitable for detecting defects appearing on a projected display screen.

SOLUTION: The projector 100 comprises a projection unit 120 which projects an image on the screen 110, an image pick up element 130 for taking in an actual projection image projected by the projection unit 120, a defect detection unit 140 for detecting the defect in the projection unit 120 based on the actual projection image taken in by the image pickup element 130, and a notification unit 150 for performing a predetermined notification when the fault detection unit 140 detects the fault. The defect detection unit 140 detects the defect in the projection unit 120 based on an original projection image which is the image to be projected by the projection unit 120 and the actual projection

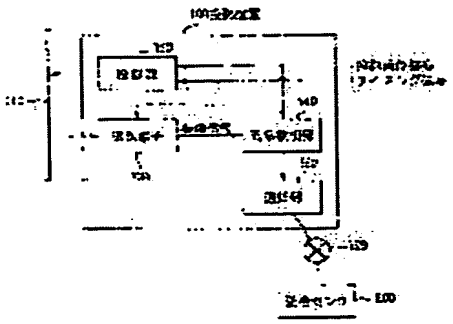

image taken in by the image pick up element 130.

LEGAL STATUS

[Date of request for examination]

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[Date of registration]

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[Date of extinction of right]

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CLAIMS

[Claim(s)]
[Claim 1]
It is the system which supervises the projection equipment which has a projection means to project an image,
Monitoring system of the projection equipment which captures the real projection image projected with said projection means, and is characterized by detecting the abnormalities of said projection means based on the captured real projection image.
[Claim 2]
It is the system which supervises the projection equipment which has a projection means to project an image,
It has an image taking-in means to capture the real projection image projected with said projection means, a malfunction detection means to detect the abnormalities of said projection means based on the real projection image captured with said image taking-in means, and a notice means of abnormalities to perform a predetermined notice when said malfunction detection means detects abnormalities,
Said malfunction detection means is the monitoring system of the projection equipment characterized by detecting the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured with said image taking-in means.
[Claim 3]
In either of claims 2,
The monitor center which supervises said projection equipment, and said projection equipment are connected possible [a communication link],
Said projection equipment has said others and image taking-in means, said malfunction detection means, and said notice means of abnormalities, [means / said / projection]
Said notice means of abnormalities is the monitoring system of the projection equipment characterized by performing a predetermined notice to said monitor center when said malfunction detection means detects abnormalities.
[Claim 4]
In either of claims 2 and 3,
Said image taking-in means is the monitoring system of the projection equipment characterized by being a 1-dimensional line sensor.
[Claim 5]
In claim 4,
Said 1-dimensional line sensor is the monitoring system of the projection equipment characterized by capturing the horizontal Rhine image from said real projection image.
[Claim 6]
In either of claims 2 and 3,
Said image taking-in means is the monitoring system of the projection equipment characterized by being

a two-dimensional area sensor.
[Claim 7]
In claim 2 thru/or either of 6,
Said predetermined notice is the monitoring system of the projection equipment characterized by including the event log of the abnormality information about the abnormalities of said projection means, and said projection equipment.
[Claim 8]
In claim 2 thru/or either of 7,
Said malfunction detection means is the monitoring system of the projection equipment characterized by contrasting said Hara projection image and said real projection image, and detecting the abnormalities of said projection means based on those points of agreement or differences.
[Claim 9]
In claim 8,
Said Hara projection image consists of a original projection image of different two or more colors,
Said real projection image comes to compound the real projection image of said two or more colors projected based on said each **** projection image, respectively,
It is the monochrome sensor which said each **** projection image was made to correspond, and was formed so that it might become possible for said image taking-in means to capture said each **** projection image,
Said malfunction detection means for said every projection image which carries out color correspondence Said Hara projection image, Contrast the projection timing and this timing, or the thing mostly incorporated by said monochrome sensor to this timing for the real projection image projected based on the original projection image concerned, and those differences are detected. Monitoring system of the projection equipment characterized by detecting the abnormalities of said projection means based on the detected difference.
[Claim 10]
In claim 8,
Said Hara projection image consists of a original projection image of different two or more colors,
Said real projection image comes to compound the real projection image of said two or more colors projected based on said each **** projection image, respectively,
It is the monochrome sensor which said each **** projection image was made to correspond, and was formed so that it might become possible for said image taking-in means to capture said each **** projection image,
Said malfunction detection means is a signal inputted into said projection means for said every projection image which carries out color correspondence. The projection picture signal which can constitute said Hara projection image, Contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated by said monochrome sensor from this timing for the real projection image which is the signal outputted from said monochrome sensor, and was projected based on the original projection image concerned, and those differences are detected. Monitoring system of the projection equipment characterized by detecting the abnormalities of said projection means based on the detected difference.
[Claim 11]
In either of claims 9 and 10,
Said projection means includes an image display means to display an image based on a projection picture signal or projection image information, and the light source which projects the image displayed with said image display means on a screen by the exposure of light,
Said malfunction detection means is the monitoring system of the projection equipment characterized by judging with said light source being unusual when a predetermined threshold is exceeded for said every projection image which carries out color correspondence.
[Claim 12]
In claim 2 thru/or either of 11,

Said malfunction detection means is the monitoring system of the projection equipment which computes difference with the pixel value of said predetermined location and the adjoining location, and is characterized by judging with said projection means being unusual the pixel value of a predetermined location, and among said real projection images among said real projection images when the computed difference exceeds a predetermined threshold.

[Claim 13]

In claim 2 thru/or either of 12,

Said malfunction detection means is the monitoring system of the projection equipment characterized by judging with said projection means of said predetermined location being unusual when the difference which computed difference with the pixel value of the isolated location, and was computed exceeds a predetermined threshold the pixel value of a predetermined location, and among said real projection images among said real projection images.

[Claim 14]

In claim 2 thru/or either of 13,

Said malfunction-detection means is the monitoring system of the projection equipment which computes difference with the pixel value of the inspection location concerned and the adjoining location, and is characterized by to judge with said projection means being unusual the pixel value of the inspection location concerned, and among said real projection images among said real projection images about two or more inspection locations among said real projection images when total of the computed difference exceeds a predetermined threshold.

[Claim 15]

In claim 12 thru/or either of 14,

Said pixel value is the monitoring system of the projection equipment characterized by adding the pixel value which sampled and sampled the pixel value of homotopic over N (N is one or more integers) time to every predetermined spacing deltat from the criteria time of day t.

[Claim 16]

In claim 2 thru/or either of 15,

Monitoring system of the projection equipment characterized by inputting the same timing signal into said projection means and said image taking-in means, and synchronizing the projection timing of said projection means, and the taking-in timing of said image taking-in means based on said timing signal.

[Claim 17]

It has a projection means to project an image, an image taking-in means to capture the real projection image projected with said projection means, a malfunction detection means to detect the abnormalities of said projection means based on the real projection image captured with said image taking-in means, and a notice means of abnormalities to perform a predetermined notice when said malfunction detection means detects abnormalities,

Said malfunction detection means is projection equipment characterized by detecting the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured with said image taking-in means.

[Claim 18]

In claim 17,

It connects with a monitor center possible [a communication link],

Said notice means of abnormalities is projection equipment characterized by performing a predetermined notice to said monitor center when said malfunction detection means detects abnormalities.

[Claim 19]

It is projection equipment connected with a monitor center possible [a communication link],

It has a projection means project an image, an image taking-in means capture the real projection image projected with said projection means, a malfunction-detection means detect the abnormalities of said projection means based on the real projection image captured with said image taking-in means, and a detection result offer means offer the malfunction detection result in said malfunction detection means

according to access from said monitor center,
Said malfunction detection means detects the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured with said image taking-in means,
Said detection result offer means is projection equipment characterized by providing said monitor center with said saved malfunction detection result when the malfunction detection result in said malfunction detection means is saved and there is access from said monitor center.
[Claim 20]
In claim 17 thru/or either of 19,
Said image taking-in means is projection equipment characterized by being a 1-dimensional line sensor.
[Claim 21]
In claim 20,
Said 1-dimensional line sensor is projection equipment characterized by capturing the horizontal Rhine image from said real projection image.
[Claim 22]
In claim 17 thru/or either of 19,
Said image taking-in means is projection equipment characterized by being a two-dimensional area sensor.
[Claim 23]
In claim 17 thru/or either of 22,
Said malfunction detection means is projection equipment characterized by contrasting said Hara projection image and said real projection image, and detecting the abnormalities of said projection means based on those points of agreement or differences.
[Claim 24]
It is the program which supervises the projection equipment which has a projection means to project an image,
The supervisor of the projection equipment which captures the real projection image projected with said projection means, and is characterized by being a program for making a computer perform processing which detects the abnormalities of said projection means based on the captured real projection image.
[Claim 25]
It is a program for performing the projection equipment which has a projection means to project an image and consists of a computer,
When an image taking-in means capture the real projection image projected with said projection means, a malfunction-detection means detect the abnormalities of said projection means based on the real projection image captured with said image taking-in means, and said malfunction-detection means detect abnormalities, it is a program for performing processing realized as a notice means of abnormalities to perform a predetermined notice,
Said malfunction detection means is the supervisor of the projection equipment characterized by detecting the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured with said image taking-in means.
[Claim 26]
It is a program for performing the projection equipment which connects with a monitor center possible [a communication link], and has a projection means to project an image, and consists of a computer,
It is a program for performing the processing realized as an image taking-in means capture the real projection image projected with said projection means, a malfunction-detection means detect the abnormalities of said projection means based on the real projection image captured with said image taking-in means, and a detection result offer means offer the malfunction-detection result in said malfunction-detection means according to access from said monitor center,
Said malfunction detection means detects the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection

image captured with said image taking-in means,
Said detection result offer means is the supervisor of the projection equipment characterized by providing said monitor center with said saved malfunction detection result when the malfunction detection result in said malfunction detection means is saved and there is access from said monitor center.
[Claim 27]
It is the approach of supervising the projection equipment which has a projection means to project an image,
The monitor approach of the projection equipment which captures the real projection image projected with said projection means, and is characterized by detecting the abnormalities of said projection means based on the captured real projection image.
[Claim 28]
It is the approach of supervising the projection equipment which has a projection means to project an image,
The image taking-in step which captures the real projection image projected with said projection means, the malfunction detection step which detects the abnormalities of said projection means based on the real projection image captured at said image taking-in step, and the notice step of abnormalities which performs a predetermined notice when abnormalities are detected at said malfunction detection step are included,
Said malfunction detection step is the monitor approach of the projection equipment characterized by detecting the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured at said image taking-in step.
[Claim 29]
It is the approach of supervising the projection equipment which has a projection means to connect with a monitor center possible [a communication link], and to project an image,
The image taking-in step which captures the real projection image projected with said projection means, the malfunction detection step which detects the abnormalities of said projection means based on the real projection image captured at said image taking-in step, and the detection result offer step which offers the malfunction detection result in said malfunction detection step according to access from said monitor center are included,
Said malfunction detection step detects the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured at said image taking-in step,
Said detection result offer step is the monitor approach of the projection equipment characterized by providing said monitor center with said saved malfunction detection result when the malfunction detection result in said malfunction detection step is saved and there is access from said monitor center.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[Field of the Invention]
[0001]
This invention relates to an approach at the system which supervises projection equipments, such as a projector, equipment and a program, and a list, and relates to the monitor approach of projection equipment at the supervisor of the monitoring system of suitable projection equipment to detect the fault on the display which appears on a projection screen especially, projection equipment, and projection equipment, and a list.
[Background of the Invention]
[0002]
Conventionally, as a technique which supervises projection equipments, such as a projector, there was a graphic display device currently indicated by the patent reference 1, for example.
This graphic display device is turned on by the electric power supply from the graphic display machine which projects an image, a power source, and a power source. The light source which displays the image projected on the graphic display machine on a screen by the exposure of light, It has the abnormality display which indicates whether a power source is unusual or the light source is unusual by the command from the control section which receives a powerfail signal from a power source when power sources are abnormalities, and receives the abnormality signal in the light source from the light source in not switching [of the light source] on the light, and a control section.
[Patent reference 1] JP,11-112912,A
[Description of the Invention]
[Problem(s) to be Solved by the Invention]
[0003]
However, if shown in the above-mentioned conventional graphic display device, when the light source is not turned on, in response to the abnormality signal in the light source from the light source, abnormalities are only notified, and it cannot perform detecting abnormalities, such as abnormalities of the light source which do not come even un-switching on the light, and a point defect of a graphic display machine, a line defect. That is, it was inadequate for detecting the fault on the display which appears on a projection screen.
Then, this invention is made paying attention to the unsolved technical problem which such a Prior art has, and aims at providing with the monitor approach of projection equipment the supervisor of the monitoring system of suitable projection equipment to detect the fault on the display which appears on a projection screen, projection equipment, and projection equipment, and a list.
[Means for Solving the Problem]
[0004]
[Invention 1] In order to attain the above-mentioned purpose, it is the monitoring system of the projection equipment of invention 1,
It is the system which supervises the projection equipment which has a projection means to project an

image,
The real projection image projected with said projection means is captured, and it is characterized by detecting the abnormalities of said projection means based on the captured real projection image.
With such a configuration, with projection equipment, an image is projected by the projection means. And the real projection image projected with the projection means is captured, and the abnormalities of a projection means are detected based on the captured real projection image.
[0005]
Thereby, since the abnormalities of a projection means are detected based on a real projection image, as compared with the former, the effectiveness that the fault on the display which appears on a projection screen is detectable is acquired on level more detailed than not only the case of not switching [of the light source] on the light but the case where the line defect has occurred in the real projection image etc.

Moreover, since the abnormalities of a projection means are detected based on a real projection image, in the internal circuitry of projection equipment, the effectiveness that abnormalities, such as a line defect of the light valve detection was difficult the light valve, a point defect, an irregular color, quantity of light unevenness, and lamp degradation, are detectable is also acquired.
[0006]
Here, a projection means is a device for generating an image and projecting the image concerned, and projection equipment is combined with the projection means including the driver of the light source, a light valve (for example, thing which used liquid crystal, DMD, LCOS, etc.), a lens, and a panel. Moreover, it may be made to realize as a device of single equipment, and a terminal and others, and may be made to realize this system as a network system which connected two or more equipments and the device of a terminal and others possible [a communication link]. In the case of the latter, each component may belong to any among two or more devices etc., as long as it connects respectively possible [a communication link]. In the monitoring system of the projection equipment of the following and invention 2, it is the same.
[0007]
[Invention 2] It is the monitoring system of the projection equipment of invention 2 further,
It is the system which supervises the projection equipment which has a projection means to project an image,
It has an image taking-in means to capture the real projection image projected with said projection means, a malfunction detection means to detect the abnormalities of said projection means based on the real projection image captured with said image taking-in means, and a notice means of abnormalities to perform a predetermined notice when said malfunction detection means detects abnormalities,
Said malfunction detection means is characterized by detecting the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured with said image taking-in means.
[0008]
With such a configuration, with projection equipment, an image is projected by the projection means. And the real projection image projected with the projection means is captured by the image taking-in means, and the abnormalities of a projection means are detected by the malfunction detection means based on the original projection image which should be projected with a projection means, and the captured real projection image. Detection of abnormalities performs a predetermined notice with the notice means of abnormalities.
[0009]
Thereby, since the abnormalities of a projection means are detected based on a original projection image and a real projection image, as compared with the former, the effectiveness that the fault on the display which appears on a projection screen is detectable is acquired on level more detailed than not only the case of not switching [of the light source] on the light but the case where the line defect has occurred in the real projection image etc. Moreover, in order to perform the comparison with a original projection image and the real projection image captured with the image taking-in means, the effectiveness that the

abnormalities of a real projection image can be grasped comparatively correctly is also acquired. Moreover, the effectiveness that it can grasp that abnormalities occurred for the projection means by predetermined notice is also acquired.

[0010]

Here, a original projection image may be the ideal image itself which says the ideal image constituted by the projection picture signal or projection image information inputted into a projection means, for example, is constituted by a projection picture signal or projection image information, and may be a sample image beforehand generated regardless of a projection picture signal or projection image information. In the monitor approach of the projection equipment invention 60 and 62, it is the same as the supervisor of the projection equipment of the following and invention 20 and 22, and the projection equipment of invention 40 and 42, and a list.

[0011]

Moreover, as long as the notice means of abnormalities performs a predetermined notice, it may be what kind of configuration, for example, it performs a predetermined notice to projection equipment, and performs a predetermined notice to the monitor center which supervises projection equipment.

[Invention 3] The monitoring system of the projection equipment of invention 3 is further set to the monitoring system of the projection equipment of invention 2,

Said projection means projects an image on a screen based on a projection picture signal or projection image information,

Said Hara projection image is characterized by being the image constituted by said projection picture signal or said projection image information.

[0012]

With such a configuration, with projection equipment, an image is projected on a screen by the projection means based on a projection picture signal or projection image information. And the real projection image projected with the projection means is captured by the image taking-in means, and the abnormalities of a projection means are detected by the malfunction detection means based on the original projection image constituted by a projection picture signal or projection image information and the captured real projection image.

[0013]

Since this detects the abnormalities of a projection means based on the original projection image and real projection image which are constituted by a projection picture signal or projection image information, the effectiveness that the fault on the display which appears on a projection screen can be detected comparatively correctly is acquired.

Moreover, when a projection picture signal is used as a real projection image, the effectiveness that abnormalities are detectable in an easy comparator circuit is also acquired by comparing the signal outputted from an image taking-in means as it is.

[0014]

Moreover, since the comparison of images is attained when projection image information is used as a real projection image (i.e., when a digital image is used as a real projection image), the effectiveness that the cause of the abnormalities of a display can be judged comparatively correctly is also acquired.

Here, projection image information is a color as a result of carrying out color composition, and it is the image which people can see directly. Moreover, a projection picture signal is a signal which is inputted into a light valve and by which RGB division was carried out. Moreover, the synchronizing signal for drawing is also contained in a projection picture signal.

[0015]

[Invention 4] The monitoring system of the projection equipment of invention 4 is further set to the monitoring system of one projection equipment of the invention 2 and 3,

The monitor center which supervises said projection equipment, and said projection equipment are connected possible [a communication link],

Said projection equipment has said others and image taking-in means, said malfunction detection means, and said notice means of abnormalities, [means / said / projection]

Said notice means of abnormalities is characterized by performing a predetermined notice to said monitor center, when said malfunction detection means detects abnormalities.
[0016]
With such a configuration, with projection equipment, if abnormalities are detected by the malfunction detection means, a predetermined notice will be performed to a monitor center by the notice means of abnormalities.
Thereby, in the monitor center, the effectiveness that it can grasp that abnormalities occurred to projection equipment by predetermined notice is acquired.
Moreover, when abnormalities are detected, by notifying the condition, the expansion to a quick maintenance support is attained and the effectiveness of raising qualities of service, such as the Billboard vision, is also acquired.
[0017]
[Invention 5] The monitoring system of the projection equipment of invention 5 is further set to the monitoring system of invention 2 thru/or one projection equipment of 4,
Said image taking-in means is characterized by being a 1-dimensional line sensor.
With such a configuration, the Rhine image is captured by the 1-dimensional line sensor from the real projection image projected with the projection means.
[0018]
Thereby, generally, since the defect of a light valve has the high probability of the line defect by poor connection, while abnormalities are detectable by the cheap sensor, the effectiveness that a system can be constituted comparatively cheaply is acquired.
[Invention 6] The monitoring system of the projection equipment of invention 6 is further set to the monitoring system of the projection equipment of invention 5,
Said 1-dimensional line sensor is characterized by capturing the horizontal Rhine image from said real projection image.
[0019]
With such a configuration, the horizontal Rhine image is captured by the 1-dimensional line sensor from the real projection image projected with the projection means. Usually, although it generates horizontally, if initial failure's line defect is removed, the perpendicular direction of a real projection image and possibility of a line defect that a vertical line defect will occur are high. Therefore, it becomes possible by capturing the horizontal Rhine image to detect a vertical line defect.
[0020]
Thereby, if a sensor is arranged so that reading can be done horizontally since a line defect is perpendicularly generated in a comparatively high probability, while almost all line defects are detectable with a cheap line sensor, the effectiveness that a system can be constituted comparatively cheaply is acquired.
[Invention 7] The monitoring system of the projection equipment of invention 7 is further set to the monitoring system of invention 2 thru/or one projection equipment of 4,
Said image taking-in means is characterized by being a two-dimensional area sensor.
[0021]
With such a configuration, an area image is captured by the two-dimensional area sensor from the real projection image projected with the projection means.
Thereby, as compared with the case where a 1-dimensional line sensor is used, the effectiveness that the fault on the display which appears on a projection screen can be detected comparatively certainly is acquired. Moreover, since it is a two-dimensional area sensor, the effectiveness that the abnormalities of local fields, such as a point defect, and an irregular color, quantity of light unevenness, are detectable is acquired.
[0022]
[Invention 8] The monitoring system of the projection equipment of invention 8 is further set to the monitoring system of invention 2 thru/or one projection equipment of 7,
Said predetermined notice is characterized by including the event log of the abnormality information

about the abnormalities of said projection means, and said projection equipment.
If abnormalities are detected by the malfunction detection means with such a configuration, the predetermined notice containing abnormality information and an event log will be performed by the notice means of abnormalities.
[0023]
The effectiveness that the information which abnormalities generated for the projection means concerning the abnormalities of a projection means remarkably, and the operation hysteresis of projection equipment can be grasped by predetermined notice by this is acquired.
Moreover, as information to notify, in order to send abnormality information and an event log, the effectiveness that an abnormality factor can be detected comparatively correctly is also acquired from the past use gestalt and device information. Moreover, the effectiveness that it can tie to the following quick action towards abnormality management is also acquired.
[0024]
[Invention 9] The monitoring system of the projection equipment of invention 9 is further set to the monitoring system of invention 2 thru/or one projection equipment of 8,
Said malfunction detection means is characterized by contrasting said Hara projection image and said real projection image, and detecting the abnormalities of said projection means based on those points of agreement or differences.
[0025]
With such a configuration, by the malfunction detection means, a original projection image and a real projection image are contrasted, and the abnormalities of a projection means are detected based on those points of agreement or differences.
Since a original projection image and a real projection image are contrasted and the abnormalities of a projection means are detected by this based on those points of agreement or differences, the effectiveness that the fault on the display which appears on a projection screen is detectable on still more detailed level is acquired. Moreover, the effectiveness that the abnormality part of a real projection image can be detected comparatively easily is also acquired by looking for a point of agreement or difference.
[0026]
Here, contrasting contrasting comrades (a picture signal or image information), such as a picture signal which contrasts images and which can remarkably constitute an image, an image, a picture signal, etc. is included in contrasting an image.
Moreover, detecting abnormalities is also included in detecting abnormalities here noting that it is unusual, when a normal purport is notified to for example, always [forward], and the notice concerned is not performed at the time of abnormalities but a notice cuts.
[0027]
[Invention 10] The monitoring system of the projection equipment of invention 10 is further set to the monitoring system of the projection equipment of invention 9,
Said malfunction detection means is characterized by contrasting the projection timing and this timing, or the thing mostly incorporated with said image taking-in means in this timing for said Hara projection image and the real projection image projected based on the original projection image concerned, and detecting the abnormalities of said projection means based on the difference which detected and detected those differences.
[0028]
With such a configuration, in a original projection image and the real projection image projected based on the original projection image, the projection timing and this timing, or the thing mostly incorporated to this timing is contrasted, those differences are detected and the abnormalities of a projection means are detected by the malfunction detection means based on the detected difference.
Since a original projection image, and the projection timing of the original projection image, this timing or the real projection image mostly captured to this timing is contrasted and the abnormalities of a projection means are detected from this based on those differences, the effectiveness that the fault on the

display which appears on a projection screen can be detected comparatively correctly is acquired.
[0029]
Moreover, although it is necessary to compare the same image logically when [of a original projection image and the real projection image captured from an image taking-in means] comparing, identification of an image can be logically guaranteed this timing or by considering as this timing mostly. Therefore, the effectiveness that the abnormality part based on a point of agreement or difference can be detected comparatively easily is also acquired.
[Invention 11] The monitoring system of the projection equipment of invention 11 is further set to the monitoring system of the projection equipment of invention 9,
Said malfunction detection means is a signal inputted into said projection means. The projection picture signal which can constitute said Hara projection image, Contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated with said image taking-in means from this timing for the real projection image which is the signal outputted from said image taking-in means, and was projected based on the original projection image concerned, and those differences are detected. It is characterized by detecting the abnormalities of said projection means based on the detected difference.
[0030]
With such a configuration, in the projection picture signal which can constitute a original projection image, and the real projection image projected based on the original projection image, the taking-in picture signal which can constitute the projection timing and this timing, or the thing mostly incorporated to this timing is contrasted, those differences are detected and the abnormalities of a projection means are detected by the malfunction detection means based on the detected difference. The projection picture signal which can constitute a original projection image by this, Since the taking-in picture signal which can constitute the projection timing and this timing, or the thing mostly incorporated to this timing is contrasted for the real projection image projected based on the original projection image and the abnormalities of a projection means are detected based on those differences The effectiveness that the fault on the display which appears on a projection screen can be detected comparatively correctly is acquired.
[0031]
Moreover, the effectiveness that difference is detectable in an easy comparator circuit is also acquired with a projection picture signal and an image taking-in means by comparing a projection picture signal with the incorporation picture signal taken in to this timing.
[Invention 12] The monitoring system of the projection equipment of invention 12 is further set to the monitoring system of the projection equipment of invention 9,
Said Hara projection image consists of a original projection image of different two or more colors,
Said real projection image comes to compound the real projection image of said two or more colors projected based on said each **** projection image, respectively,
It is the monochrome sensor which said each **** projection image was made to correspond, and was formed so that it might become possible for said image taking-in means to capture said each **** projection image,
Said malfunction-detection means is characterized by to detect the abnormalities of said projection means based on the difference which detected those differences for every projection image of said which carries out color correspondence by contrasting the projection timing and this timing, or the thing mostly incorporated by said monochrome sensor to this timing for said Hara projection image and the real projection image projected based on the original projection image concerned, and was detected.
[0032]
With such a configuration, each **** projection image is captured by the monochrome sensor. And by the malfunction detection means, those differences are detected for every projection image which carries out color correspondence by contrasting the projection timing and this timing, or the thing mostly incorporated by the monochrome sensor to this timing in a original projection image and the real projection image projected based on the original projection image, and the abnormalities of a projection

means are detected based on the detected difference.
[0033]
By this, contrast a original projection image, and the projection timing of the original projection image, this timing or the real projection image mostly captured to this timing, and the abnormalities of a projection means are detected based on those differences. Moreover, since the abnormalities of a projection means are detected for every projection image which carries out color correspondence, the effectiveness that the fault on the display which appears on a projection screen can be detected comparatively correctly the whole color is acquired.
[0034]
Moreover, it becomes possible by dividing the image of different two or more colors, respectively, displaying it, and incorporating with an image taking-in means to detect the abnormalities of the optical system of each color by one sensor (monochrome sensor). Consequently, the effectiveness that a malfunction detection means is realizable by the cheap sensor is also acquired.
[Invention 13] The monitoring system of the projection equipment of invention 13 is further set to the monitoring system of the projection equipment of invention 9,
Said Hara projection image consists of a original projection image of different two or more colors,
Said real projection image comes to compound the real projection image of said two or more colors projected based on said each **** projection image, respectively,
It is the monochrome sensor which said each **** projection image was made to correspond, and was formed so that it might become possible for said image taking-in means to capture said each **** projection image,
Said malfunction detection means is a signal inputted into said projection means for said every projection image which carries out color correspondence. The projection picture signal which can constitute said Hara projection image, Contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated by said monochrome sensor from this timing for the real projection image which is the signal outputted from said monochrome sensor, and was projected based on the original projection image concerned, and those differences are detected. It is characterized by detecting the abnormalities of said projection means based on the detected difference.
[0035]
With such a configuration, each **** projection image is captured by the monochrome sensor. With a malfunction detection means, for every projection image which carries out color correspondence And the projection picture signal which can constitute a original projection image, In the real projection image projected based on the original projection image, contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated by the monochrome sensor from this timing, and those differences are detected. The abnormalities of a projection means are detected based on the detected difference.
[0036]
The projection picture signal which can constitute a original projection image by this, Contrast the taking-in picture signal which can constitute the projection timing and this timing, or the thing mostly incorporated to this timing for the real projection image projected based on the original projection image, and the abnormalities of a projection means are detected based on those differences. Moreover, since the abnormalities of a projection means are detected for every projection image which carries out color correspondence, the effectiveness that the fault on the display which appears on a projection screen can be detected comparatively correctly the whole color is acquired.
[0037]
Moreover, the effectiveness that abnormalities are detectable in a cheap sensor and a cheap circuit is also acquired by measuring the output of a monochrome sensor with a picture signal.
[Invention 14] The monitoring system of the projection equipment of invention 14 is further set to the monitoring system of one projection equipment of the invention 12 and 13,
Said projection means includes an image display means to display an image based on a projection picture signal or projection image information, and the light source which projects the image displayed

with said image display means on a screen by the exposure of light,
It is characterized by judging with said light source of said malfunction detection means being unusual when a predetermined threshold is exceeded for said every projection image which carries out color correspondence.
[0038]
With such a configuration, with projection equipment, the image as which the image was displayed and displayed by the image display means based on a projection picture signal or projection image information is projected on a screen by the exposure of the light from the light source. That is, since it is projected by the exposure of the light from the one light source, and they are compounded and it is projected on a screen, when abnormalities are in each **** projection images of all, possibility that abnormalities are in the light source is high [each **** projection image]. Therefore, detection of the difference which exceeds the predetermined range for every projection image which carries out color correspondence judges that the light source is unusual with a malfunction detection means.
[0039]
The effectiveness that it is detectable that the light source is unusual only by contrasting a original projection image and a real projection image by this is acquired.
Moreover, in the light source, since the quantity of light change by aging and the brightness change by the external world factor exist, the effectiveness detect the abnormalities of the light source and that things can be carried out is also acquired by setting up change by such factor as tolerance.
[0040]
Moreover, the effectiveness detect abnormalities effectively also in projection equipment which uses the light source for example, according to RGB and that things can be carried out is also acquired by judging abnormalities for every color.
[Invention 15] The monitoring system of the projection equipment of invention 15 is further set to the monitoring system of invention 2 thru/or one projection equipment of 14,
Said malfunction detection means is characterized by judging with said projection means being unusual when the difference which computed difference with the pixel value of said predetermined location and the adjoining location, and was computed exceeds a predetermined threshold the pixel value of a predetermined location, and among said real projection images among said real projection images.
[0041]
With such a configuration, among real projection images, if the difference which difference with the pixel value of a predetermined location and the adjoining location was computed, and was computed exceeds a predetermined threshold, it will judge that a projection means is unusual the pixel value of a predetermined location, and among real projection images with a malfunction detection means.
Thereby, since the abnormalities of a projection means are detected based on the difference of contiguity pixels, the effectiveness that the fault on the display which appears on a projection screen can be detected comparatively correctly is acquired.
[0042]
Moreover, while the local abnormalities of a projection image are detectable by comparing a pixel value, the effectiveness that the abnormalities of a light valve etc. can be judged from the abnormalities of a tint is also acquired in the abnormalities of the light source from the abnormalities of brightness which are the cause.
Here, a pixel value shows the brightness and the tint of a pixel and are brightness and the color difference.
[0043]
[Invention 16] The monitoring system of the projection equipment of invention 16 is further set to the monitoring system of invention 2 thru/or one projection equipment of 15,
Said malfunction detection means is characterized by judging with said projection means being unusual when the difference which computed difference with the pixel value of the location which said predetermined location isolated, and was computed exceeds a predetermined threshold the pixel value of a predetermined location, and among said real projection images among said real projection images.

[0044]
With such a configuration, among real projection images, if the difference by which difference with the pixel value of the location which the predetermined location isolated was computed and computed exceeds a predetermined threshold, it will judge that a projection means is unusual the pixel value of a predetermined location, and among real projection images with a malfunction detection means.
While the local abnormalities of a projection image are detectable by comparing a pixel value by this, the effectiveness that the abnormalities of a light valve etc. can be judged from the abnormalities of a tint is acquired in the abnormalities of the light source from the abnormalities of brightness which are the cause.
[0045]
[Invention 17] The monitoring system of the projection equipment of invention 17 is further set to the monitoring system of invention 2 thru/or one projection equipment of 16,
Said malfunction-detection means is characterized the pixel value of the inspection location concerned, and among said real projection images among said real projection images about two or more inspection locations among said real projection images by to judge with said projection means being unusual when total of the difference which computed difference with the pixel value of the inspection location concerned and the adjoining location, and was computed exceeds a predetermined threshold.
[0046]
With such a configuration, among real projection images, if total of the difference which difference with the pixel value of an inspection location and the adjoining location was computed, and was computed exceeds a predetermined threshold, it will judge that a projection means is unusual the pixel value of an inspection location, and among real projection images about the inspection location of the plurality among real projection images with a malfunction detection means.
Since this detects the abnormalities of a projection means based on total of the difference of the computed contiguity pixels about two or more inspection locations, the effectiveness that the fault on the display which appears on a projection screen can be detected comparatively correctly is acquired.
[0047]
Moreover, the effectiveness that it can become possible to absorb location **** of a projection image, and the mistaken malfunction detection can be prevented is also acquired by comparing the pixel value of the location which adjoined the pixel value of an inspection location.
Moreover, the effectiveness that abnormalities which are changing with locations gradually in a certain image field are detectable is also acquired.
[0048]
[Invention 18] The monitoring system of the projection equipment of invention 18 is further set to the monitoring system of invention 15 thru/or one projection equipment of 17,
Said pixel value is characterized by adding the pixel value which sampled and sampled the pixel value of homotopic over N (N is one or more integers) time to every predetermined spacing deltat from the criteria time of day t.
[0049]
With such a configuration, from the criteria time of day t, the pixel value of homotopic is sampled by every predetermined spacing deltat over N time, and the sampled pixel value is added to it. And based on the pixel value which brings the addition result, difference is computed by the malfunction detection means.
Thereby, since N time sampling of the pixel value of homotopic is carried out, even if it is the case where abnormalities occur working, the effectiveness of being detectable is acquired.
[0050]
[Invention 19] The monitoring system of the projection equipment of invention 19 is further set to the monitoring system of invention 2 thru/or one projection equipment of 18,
The same timing signal is inputted into said projection means and said image taking-in means, and it is characterized by synchronizing the projection timing of said projection means, and the taking-in timing of said image taking-in means based on said timing signal.

[0051]
With such a configuration, the same timing signal is inputted into a projection means and an image taking-in means, and the projection timing of a projection means and the taking-in timing of an image taking-in means synchronize based on the timing signal.
Thereby, since the projection timing of a projection means and the taking-in timing of an image taking-in means are synchronized, it becomes possible to capture the real projection image corresponding to a original projection image, and the effectiveness that the fault on the display which appears on a projection screen can be detected comparatively correctly is acquired.
[0052]
Moreover, in order for the same timing signal to perform projection of an image, and incorporation of an image, it becomes possible to compare the same image logically, and the effectiveness that a comparison in a cheap circuit is realizable is also acquired.
[Invention 20] On the other hand, in order to attain the above-mentioned purpose, it is projection equipment of invention 20,
It has a projection means to project an image, an image taking-in means to capture the real projection image projected with said projection means, a malfunction detection means to detect the abnormalities of said projection means based on the real projection image captured with said image taking-in means, and a notice means of abnormalities to perform a predetermined notice when said malfunction detection means detects abnormalities,
Said malfunction detection means is characterized by detecting the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured with said image taking-in means.
[0053]
With such a configuration, with projection equipment, if an image is projected by the projection means, the projected real projection image will be captured by the image taking-in means, and the abnormalities of a projection means will be detected by the malfunction detection means based on the original projection image which should be projected with a projection means, and the captured real projection image. Detection of abnormalities performs a predetermined notice with the notice means of abnormalities.
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 2.
[0054]
Here, a projection means is a device for generating an image and projecting the image concerned, and projection equipment is combined with the projection means including the driver of the light source, a light valve (for example, thing which used liquid crystal, DMD, LCOS, etc.), a lens, and a panel.
[Invention 21] The projection equipment of invention 21 is further set to the projection equipment of invention 20,
It connects with a monitor center possible [a communication link],
Said notice means of abnormalities is characterized by performing a predetermined notice to said monitor center, when said malfunction detection means detects abnormalities.
[0055]
With such a configuration, with projection equipment, if abnormalities are detected by the malfunction detection means, a predetermined notice will be performed to a monitor center by the notice means of abnormalities.
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 4.
[Invention 22] It is projection equipment of invention 22 further,
It is projection equipment connected with a monitor center possible [a communication link],
It has a projection means project an image, an image taking-in means capture the real projection image projected with said projection means, a malfunction-detection means detect the abnormalities of said projection means based on the real projection image captured with said image taking-in means, and a

detection result offer means offer the malfunction detection result in said malfunction detection means according to access from said monitor center,
Said malfunction detection means detects the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured with said image taking-in means,
Said detection result offer means is characterized by providing said monitor center with said saved malfunction detection result, when the malfunction detection result in said malfunction detection means is saved and there is access from said monitor center.
[0056]
With such a configuration, with projection equipment, if an image is projected by the projection means, the projected real projection image will be captured by the image taking-in means, and the abnormalities of a projection means will be detected by the malfunction detection means based on the original projection image which should be projected with a projection means, and the captured real projection image. And a monitor center is provided with the malfunction detection result saved, when the malfunction detection result in a malfunction detection means is saved by the detection result offer means and there is access from a monitor center.
[0057]
On the other hand, with projection equipment, if there is access from a monitor center, a monitor center will be provided with the malfunction detection result saved by the detection result offer means.
In order to store abnormality information and to offer information by this at the time of access from a monitor pin center,large, the need of always notifying to a monitor pin center,large is lost, and the effectiveness that network traffic is reducible is acquired.
[0058]
Moreover, the effectiveness that the cause of abnormalities can be traced comparatively correctly is also acquired from the information on past by storing abnormality information.
[Invention 23] The projection equipment of invention 23 is further set to invention 20 thru/or one projection equipment of 22,
Said projection means projects an image on a screen based on a projection picture signal or projection image information,
Said Hara projection image is characterized by being the image constituted by said projection picture signal or said projection image information.
[0059]
With such a configuration, with projection equipment, an image is projected on a screen by the projection means based on a projection picture signal or projection image information. And the real projection image projected with the projection means is captured by the image taking-in means, and the abnormalities of a projection means are detected by the malfunction detection means based on the original projection image constituted by a projection picture signal or projection image information and the captured real projection image.
[0060]
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 3.
Here, projection image information is a color as a result of carrying out color composition, and it is the image which people can see directly. Moreover, a projection picture signal is a signal which is inputted into a light valve and by which RGB division was carried out. Moreover, the synchronizing signal for drawing is also contained in a projection picture signal.
[Invention 24] The projection equipment of invention 24 is further set to invention 20 thru/or one projection equipment of 23,
Said image taking-in means is characterized by being a 1-dimensional line sensor.
[0061]
With such a configuration, the Rhine image is captured by the 1-dimensional line sensor from the real projection image projected with the projection means.

Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 5.
[Invention 25] The projection equipment of invention 25 is further set to the projection equipment of invention 24,
Said 1-dimensional line sensor is characterized by capturing the horizontal Rhine image from said real projection image.
[0062]
With such a configuration, the horizontal Rhine image is captured by the 1-dimensional line sensor from the real projection image projected with the projection means. Usually, although it generates horizontally, if initial failure's line defect is removed, the perpendicular direction of a real projection image and possibility of a line defect that a vertical line defect will occur are high. Therefore, it becomes possible by capturing the horizontal Rhine image to detect a vertical line defect.
[0063]
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 6.
[Invention 26] The projection equipment of invention 26 is further set to invention 20 thru/or one projection equipment of 23,
Said image taking-in means is characterized by being a two-dimensional area sensor.
With such a configuration, an area image is captured by the two-dimensional area sensor from the real projection image projected with the projection means.
[0064]
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 7.
[Invention 27] The projection equipment of invention 27 is further set to invention 20 thru/or one projection equipment of 26,
Said predetermined notice is characterized by including the event log of the abnormality information about the abnormalities of said projection means, and said projection equipment.
[0065]
If abnormalities are detected by the malfunction detection means with such a configuration, the predetermined notice containing abnormality information and an event log will be performed by the notice means of abnormalities.
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 8.
[Invention 28] The projection equipment of invention 28 is further set to invention 20 thru/or one projection equipment of 27,
Said malfunction detection means is characterized by contrasting said Hara projection image and said real projection image, and detecting the abnormalities of said projection means based on those points of agreement or differences.
[0066]
With such a configuration, by the malfunction detection means, a original projection image and a real projection image are contrasted, and the abnormalities of a projection means are detected based on those points of agreement or differences.
Here, contrasting contrasting comrades (a picture signal or image information), such as a picture signal which contrasts images and which can remarkably constitute an image, an image, a picture signal, etc. is included in contrasting an image.
[0067]
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 9.
[Invention 29] The projection equipment of invention 29 is further set to the projection equipment of invention 28,
Said malfunction detection means is characterized by contrasting the projection timing and this timing,

or the thing mostly incorporated with said image taking-in means in this timing for said Hara projection image and the real projection image projected based on the original projection image concerned, and detecting the abnormalities of said projection means based on the difference which detected and detected those differences.
[0068]
With such a configuration, in a original projection image and the real projection image projected based on the original projection image, the projection timing and this timing, or the thing mostly incorporated to this timing is contrasted, those differences are detected and the abnormalities of a projection means are detected by the malfunction detection means based on the detected difference.
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 10.
[0069]
[Invention 30] The projection equipment of invention 30 is further set to the projection equipment of invention 28,
Said malfunction detection means is a signal inputted into said projection means. The projection picture signal which can constitute said Hara projection image, Contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated with said image taking-in means from this timing for the real projection image which is the signal outputted from said image taking-in means, and was projected based on the original projection image concerned, and those differences are detected. It is characterized by detecting the abnormalities of said projection means based on the detected difference.
[0070]
With such a configuration, in the projection picture signal which can constitute a original projection image, and the real projection image projected based on the original projection image, the taking-in picture signal which can constitute the projection timing and this timing, or the thing mostly incorporated to this timing is contrasted, those differences are detected and the abnormalities of a projection means are detected by the malfunction detection means based on the detected difference.
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 11.
[0071]
[Invention 31] The projection equipment of invention 31 is further set to the projection equipment of invention 28,
Said Hara projection image consists of a original projection image of different two or more colors,
Said real projection image comes to compound the real projection image of said two or more colors projected based on said each **** projection image, respectively,
It is the monochrome sensor which said each **** projection image was made to correspond, and was formed so that it might become possible for said image taking-in means to capture said each **** projection image,
Said malfunction-detection means is characterized by to detect the abnormalities of said projection means based on the difference which detected those differences for every projection image of said which carries out color correspondence by contrasting the projection timing and this timing, or the thing mostly incorporated by said monochrome sensor to this timing for said Hara projection image and the real projection image projected based on the original projection image concerned, and was detected.
[0072]
With such a configuration, each **** projection image is captured by the monochrome sensor. And by the malfunction detection means, those differences are detected for every projection image which carries out color correspondence by contrasting the projection timing and this timing, or the thing mostly incorporated by the monochrome sensor to this timing in a original projection image and the real projection image projected based on the original projection image, and the abnormalities of a projection means are detected based on the detected difference.
[0073]

Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 12.
[Invention 32] The projection equipment of invention 32 is further set to the projection equipment of invention 28,
Said Hara projection image consists of a original projection image of different two or more colors,
Said real projection image comes to compound the real projection image of said two or more colors projected based on said each **** projection image, respectively,
It is the monochrome sensor which said each **** projection image was made to correspond, and was formed so that it might become possible for said image taking-in means to capture said each **** projection image,
Said malfunction detection means is a signal inputted into said projection means for said every projection image which carries out color correspondence. The projection picture signal which can constitute said Hara projection image, Contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated by said monochrome sensor from this timing for the real projection image which is the signal outputted from said monochrome sensor, and was projected based on the original projection image concerned, and those differences are detected. It is characterized by detecting the abnormalities of said projection means based on the detected difference.
[0074]
With such a configuration, each **** projection image is captured by the monochrome sensor. With a malfunction detection means, for every projection image which carries out color correspondence And the projection picture signal which can constitute a original projection image, In the real projection image projected based on the original projection image, contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated by the monochrome sensor from this timing, and those differences are detected. The abnormalities of a projection means are detected based on the detected difference.
[0075]
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 13.
[Invention 33] The projection equipment of invention 33 is further set to one projection equipment of the invention 31 and 32,
Said projection means includes an image display means to display an image based on a projection picture signal or projection image information, and the light source which projects the image displayed with said image display means on a screen by the exposure of light,
It is characterized by judging with said light source of said malfunction detection means being unusual when a predetermined threshold is exceeded for said every projection image which carries out color correspondence.
[0076]
With such a configuration, with projection equipment, the image as which the image was displayed and displayed by the image display means based on a projection picture signal or projection image information is projected on a screen by the exposure of the light from the light source. That is, since it is projected by the exposure of the light from the one light source, and they are compounded and it is projected on a screen, when abnormalities are in each **** projection images of all, possibility that abnormalities are in the light source is high [each **** projection image]. Therefore, detection of the difference which exceeds the predetermined range for every projection image which carries out color correspondence judges that the light source is unusual with a malfunction detection means.
[0077]
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 14.
[Invention 34] The projection equipment of invention 34 is further set to invention 20 thru/or one projection equipment of 33,
Said malfunction detection means is characterized by judging with said projection means being unusual

when the difference which computed difference with the pixel value of said predetermined location and the adjoining location, and was computed exceeds a predetermined threshold the pixel value of a predetermined location, and among said real projection images among said real projection images.
[0078]
With such a configuration, among real projection images, if the difference which difference with the pixel value of a predetermined location and the adjoining location was computed, and was computed exceeds a predetermined threshold, it will judge that a projection means is unusual the pixel value of a predetermined location, and among real projection images with a malfunction detection means.
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 15.
[Invention 35] The projection equipment of invention 35 is further set to invention 20 thru/or one projection equipment of 34,
Said malfunction detection means is characterized by judging with said projection means being unusual when the difference which computed difference with the pixel value of the location which said predetermined location isolated, and was computed exceeds a predetermined threshold the pixel value of a predetermined location, and among said real projection images among said real projection images.
[0079]
With such a configuration, among real projection images, if the difference by which difference with the pixel value of the location which the predetermined location isolated was computed and computed exceeds a predetermined threshold, it will judge that a projection means is unusual the pixel value of a predetermined location, and among real projection images with a malfunction detection means.
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 16.
[Invention 36] The projection equipment of invention 36 is further set to invention 20 thru/or one projection equipment of 35,
Said malfunction-detection means is characterized the pixel value of the inspection location concerned, and among said real projection images among said real projection images about two or more inspection locations among said real projection images by to judge with said projection means being unusual when total of the difference which computed difference with the pixel value of the inspection location concerned and the adjoining location, and was computed exceeds a predetermined threshold.
[0080]
With such a configuration, among real projection images, if total of the difference which difference with the pixel value of an inspection location and the adjoining location was computed, and was computed exceeds a predetermined threshold, it will judge that a projection means is unusual the pixel value of an inspection location, and among real projection images about the inspection location of the plurality among real projection images with a malfunction detection means.
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 17.
[0081]
[Invention 37] The projection equipment of invention 37 is further set to invention 34 thru/or one projection equipment of 36,
Said pixel value is characterized by adding the pixel value which sampled and sampled the pixel value of homotopic over N (N is one or more integers) time to every predetermined spacing deltat from the criteria time of day t.
[0082]
With such a configuration, from the criteria time of day t, the pixel value of homotopic is sampled by every predetermined spacing deltat over N time, and the sampled pixel value is added to it. And based on the pixel value which brings the addition result, difference is computed by the malfunction detection means.
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 18.

[Invention 38] The projection equipment of invention 38 is further set to invention 20 thru/or one projection equipment of 37,
The same timing signal is inputted into said projection means and said image taking-in means, and it is characterized by synchronizing the projection timing of said projection means, and the taking-in timing of said image taking-in means based on said timing signal.
[0083]
With such a configuration, the same timing signal is inputted into a projection means and an image taking-in means, and the projection timing of a projection means and the taking-in timing of an image taking-in means synchronize based on the timing signal.
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of a publication is acquired by invention 19.
[Invention 39] On the other hand, in order to attain the above-mentioned purpose, it is the supervisor of the projection equipment of invention 39,
It is the program which supervises the projection equipment which has a projection means to project an image,
The real projection image projected with said projection means is captured, and it is characterized by being a program for making a computer perform processing which detects the abnormalities of said projection means based on the captured real projection image.
[0084]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the monitoring system of the projection equipment of invention 1 will be acquired.
[Invention 40] It is the supervisor of the projection equipment of invention 40 further,
It is a program for performing the projection equipment which has a projection means to project an image and consists of a computer,
When an image taking-in means capture the real projection image projected with said projection means, a malfunction-detection means detect the abnormalities of said projection means based on the real projection image captured with said image taking-in means, and said malfunction-detection means detect abnormalities, it is a program for performing processing realized as a notice means of abnormalities to perform a predetermined notice,
Said malfunction detection means is characterized by detecting the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured with said image taking-in means.
[0085]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 20 will be acquired.
Here, a projection means is a device for generating an image and projecting the image concerned, and projection equipment is combined with the projection means including the driver of the light source, a light valve (for example, thing which used liquid crystal, DMD, LCOS, etc.), a lens, and a panel.
[0086]
[Invention 41] The supervisor of the projection equipment of invention 41 is further set to the supervisor of the projection equipment of invention 40,
It connects with a monitor center possible [a communication link],
Said notice means of abnormalities is characterized by performing a predetermined notice to said monitor center, when said malfunction detection means detects abnormalities.
[0087]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 21 will be acquired.
[Invention 42] It is the supervisor of the projection equipment of invention 42 further,

It is a program for performing the projection equipment which connects with a monitor center possible [a communication link], and has a projection means to project an image, and consists of a computer,
It is a program for performing the processing realized as an image taking-in means capture the real projection image projected with said projection means, a malfunction-detection means detect the abnormalities of said projection means based on the real projection image captured with said image taking-in means, and a detection result offer means offer the malfunction-detection result in said malfunction-detection means according to access from said monitor center,
Said malfunction detection means detects the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured with said image taking-in means,
Said detection result offer means is characterized by providing said monitor center with said saved malfunction detection result, when the malfunction detection result in said malfunction detection means is saved and there is access from said monitor center.
[0088]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 22 will be acquired.
[Invention 43] The supervisor of the projection equipment of invention 43 is further set to the supervisor of invention 40 thru/or one projection equipment of 42,
Said projection means projects an image on a screen based on a projection picture signal or projection image information,
Said Hara projection image is characterized by being the image constituted by said projection picture signal or said projection image information.
[0089]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 23 will be acquired.
Here, projection image information is a color as a result of carrying out color composition, and it is the image which people can see directly. Moreover, a projection picture signal is a signal which is inputted into a light valve and by which RGB division was carried out. Moreover, the synchronizing signal for drawing is also contained in a projection picture signal.
[0090]
[Invention 44] The supervisor of the projection equipment of invention 44 is further set to the supervisor of invention 40 thru/or one projection equipment of 43,
Said image taking-in means is characterized by capturing said real projection image using a 1-dimensional line sensor.
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 24 will be acquired.
[0091]
[Invention 45] The supervisor of the projection equipment of invention 45 is further set to the supervisor of the projection equipment of invention 44,
Said 1-dimensional line sensor is characterized by capturing the horizontal Rhine image from said real projection image.
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 25 will be acquired.
[0092]
[Invention 46] The supervisor of the projection equipment of invention 46 is further set to the supervisor of invention 40 thru/or one projection equipment of 43,
Said image taking-in means is characterized by capturing said real projection image using a two-

dimensional area sensor.
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 26 will be acquired.
[0093]
[Invention 47] The supervisor of the projection equipment of invention 47 is further set to the supervisor of invention 40 thru/or one projection equipment of 46,
Said predetermined notice is characterized by including the event log of the abnormality information about the abnormalities of said projection means, and said projection equipment.
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 27 will be acquired.
[0094]
[Invention 48] The supervisor of the projection equipment of invention 48 is further set to the supervisor of invention 40 thru/or one projection equipment of 47,
Said malfunction detection means is characterized by contrasting said Hara projection image and said real projection image, and detecting the abnormalities of said projection means based on those points of agreement or differences.
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 28 will be acquired.
[0095]
[Invention 49] The supervisor of the projection equipment of invention 49 is further set to the supervisor of the projection equipment of invention 48,
Said malfunction detection means is characterized by contrasting the projection timing and this timing, or the thing mostly incorporated with said image taking-in means in this timing for said Hara projection image and the real projection image projected based on the original projection image concerned, and detecting the abnormalities of said projection means based on the difference which detected and detected those differences.
[0096]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 29 will be acquired.
[Invention 50] The supervisor of the projection equipment of invention 50 is further set to the supervisor of the projection equipment of invention 48,
Said malfunction detection means is a signal inputted into said projection means. The projection picture signal which can constitute said Hara projection image, Contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated with said image taking-in means from this timing for the real projection image which is the signal outputted from said image taking-in means, and was projected based on the original projection image concerned, and those differences are detected. It is characterized by detecting the abnormalities of said projection means based on the detected difference.
[0097]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 30 will be acquired.
[Invention 51] The supervisor of the projection equipment of invention 51 is further set to the supervisor of the projection equipment of invention 48,
Said Hara projection image consists of a original projection image of different two or more colors,
Said real projection image comes to compound the real projection image of said two or more colors projected based on said each **** projection image, respectively,

Said each **** projection image is captured using the monochrome sensor which said each **** projection image was made to correspond, and was formed so that it might become possible for said image taking-in means to capture said each **** projection image,
Said malfunction-detection means is characterized by to detect the abnormalities of said projection means based on the difference which detected those differences for every projection image of said which carries out color correspondence by contrasting the projection timing and this timing, or the thing mostly incorporated by said monochrome sensor to this timing for said Hara projection image and the real projection image projected based on the original projection image concerned, and was detected.
[0098]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 31 will be acquired.
[Invention 52] The supervisor of the projection equipment of invention 52 is further set to the supervisor of the projection equipment of invention 48,
Said Hara projection image consists of a original projection image of different two or more colors,
Said real projection image comes to compound the real projection image of said two or more colors projected based on said each **** projection image, respectively,
Said each **** projection image is captured using the monochrome sensor which said each **** projection image was made to correspond, and was formed so that it might become possible for said image taking-in means to capture said each **** projection image,
Said malfunction detection means is a signal inputted into said projection means for said every projection image which carries out color correspondence. The projection picture signal which can constitute said Hara projection image, Contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated by said monochrome sensor from this timing for the real projection image which is the signal outputted from said monochrome sensor, and was projected based on the original projection image concerned, and those differences are detected. It is characterized by detecting the abnormalities of said projection means based on the detected difference.
[0099]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 32 will be acquired.
[Invention 53] The supervisor of the projection equipment of invention 53 is further set to the supervisor of one projection equipment of the invention 51 and 52,
Said projection means includes an image display means to display an image based on a projection picture signal or projection image information, and the light source which projects the image displayed with said image display means on a screen by the exposure of light,
It is characterized by judging with said light source of said malfunction detection means being unusual when a predetermined threshold is exceeded for said every projection image which carries out color correspondence.
[0100]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 33 will be acquired.
[Invention 54] The supervisor of the projection equipment of invention 54 is further set to the supervisor of invention 40 thru/or one projection equipment of 53,
Said malfunction detection means is characterized by judging with said projection means being unusual when the difference which computed difference with the pixel value of said predetermined location and the adjoining location, and was computed exceeds a predetermined threshold the pixel value of a predetermined location, and among said real projection images among said real projection images.
[0101]
If with such a configuration a program is read and a computer performs processing according to the read

program by computer, an operation and effectiveness equivalent to the projection equipment of invention 34 will be acquired.
[Invention 55] The supervisor of the projection equipment of invention 55 is further set to the supervisor of invention 40 thru/or one projection equipment of 54,
Said malfunction detection means is characterized by judging with said projection means being unusual when the difference which computed difference with the pixel value of the location which said predetermined location isolated, and was computed exceeds a predetermined threshold the pixel value of a predetermined location, and among said real projection images among said real projection images.
[0102]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 35 will be acquired.
[Invention 56] The supervisor of the projection equipment of invention 56 is further set to the supervisor of invention 40 thru/or one projection equipment of 55,
Said malfunction-detection means is characterized the pixel value of the inspection location concerned, and among said real projection images among said real projection images about two or more inspection locations among said real projection images by to judge with said projection means being unusual when total of the difference which computed difference with the pixel value of the inspection location concerned and the adjoining location, and was computed exceeds a predetermined threshold.
[0103]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 36 will be acquired.
[Invention 57] The supervisor of the projection equipment of invention 57 is further set to the supervisor of invention 54 thru/or one projection equipment of 56,
Said pixel value is characterized by adding the pixel value which sampled and sampled the pixel value of homotopic over N (N is one or more integers) time to every predetermined spacing deltat from the criteria time of day t.
[0104]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 37 will be acquired.
[Invention 58] The supervisor of the projection equipment of invention 58 is further set to the supervisor of invention 40 thru/or one projection equipment of 57,
Said image taking-in means inputs the same signal as the timing signal which said projection means inputs, and is characterized by synchronizing the projection timing of said projection means, and the taking-in timing which captures said real projection image based on said timing signal.
[0105]
If with such a configuration a program is read and a computer performs processing according to the read program by computer, an operation and effectiveness equivalent to the projection equipment of invention 38 will be acquired.
[Invention 59] On the other hand, in order to attain the above-mentioned purpose, it is the monitor approach of the projection equipment invention 59,
It is the approach of supervising the projection equipment which has a projection means to project an image,
The real projection image projected with said projection means is captured, and it is characterized by detecting the abnormalities of said projection means based on the captured real projection image.
[0106]
Thereby, effectiveness equivalent to the monitoring system of the projection equipment of invention 1 is acquired.
[Invention 60] It is the monitor approach of the projection equipment invention 60 further,

It is the approach of supervising the projection equipment which has a projection means to project an image,
The image taking-in step which captures the real projection image projected with said projection means, the malfunction detection step which detects the abnormalities of said projection means based on the real projection image captured at said image taking-in step, and the notice step of abnormalities which performs a predetermined notice when abnormalities are detected at said malfunction detection step are included,
Said malfunction detection step is characterized by detecting the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured at said image taking-in step.
[0107]
Thereby, effectiveness equivalent to the projection equipment of invention 20 is acquired.
Here, a projection means is a device for generating an image and projecting the image concerned, and projection equipment is combined with the projection means including the driver of the light source, a light valve (for example, thing which used liquid crystal, DMD, LCOS, etc.), a lens, and a panel.
[Invention 61] The monitor approach of the projection equipment invention 61 is further set to the monitor approach of the projection equipment invention 60,
It connects with a monitor center possible [a communication link],
Said notice step of abnormalities is characterized by performing a predetermined notice to said monitor center, when abnormalities are detected at said malfunction detection step.
[0108]
Thereby, effectiveness equivalent to the projection equipment of invention 21 is acquired.
[Invention 61] It is the monitor approach of the projection equipment invention 61 further,
It is the approach of supervising the projection equipment which has a projection means to connect with a monitor center possible [a communication link], and to project an image,
The image taking-in step which captures the real projection image projected with said projection means, the malfunction detection step which detects the abnormalities of said projection means based on the real projection image captured at said image taking-in step, and the detection result offer step which offers the malfunction detection result in said malfunction detection step according to access from said monitor center are included,
Said malfunction detection step detects the abnormalities of said projection means based on the original projection image which should be projected with said projection means, and the real projection image captured at said image taking-in step,
Said detection result offer step is characterized by providing said monitor center with said saved malfunction detection result, when the malfunction detection result in said malfunction detection step is saved and there is access from said monitor center.
[0109]
Thereby, effectiveness equivalent to the projection equipment of invention 22 is acquired.
[Invention 63] The monitor approach of the projection equipment invention 63 is further set to the monitor approach of invention 60 thru/or one projection equipment of 62,
Said projection means projects an image on a screen based on a projection picture signal or projection image information,
Said Hara projection image is characterized by being the image constituted by said projection picture signal or said projection image information.
[0110]
Thereby, effectiveness equivalent to the projection equipment of invention 23 is acquired.
Here, projection image information is a color as a result of carrying out color composition, and it is the image which people can see directly. Moreover, a projection picture signal is a signal which is inputted into a light valve and by which RGB division was carried out. Moreover, the synchronizing signal for drawing is also contained in a projection picture signal.
[Invention 64] The monitor approach of the projection equipment invention 64 is further set to the

monitor approach of invention 60 thru/or one projection equipment of 63,
Said image taking-in step is characterized by capturing said real projection image using a 1-dimensional line sensor.
[0111]
Thereby, effectiveness equivalent to the projection equipment of invention 24 is acquired.
[Invention 65] The monitor approach of the projection equipment invention 65 is further set to the monitor approach of the projection equipment invention 64,
Said 1-dimensional line sensor is characterized by capturing the horizontal Rhine image from said real projection image.
[0112]
Thereby, effectiveness equivalent to the projection equipment of invention 25 is acquired.
[Invention 66] The monitor approach of the projection equipment invention 66 is further set to the monitor approach of invention 60 thru/or one projection equipment of 63,
Said image taking-in step is characterized by capturing said real projection image using a two-dimensional area sensor.
[0113]
Thereby, effectiveness equivalent to the projection equipment of invention 26 is acquired.
[Invention 67] The monitor approach of the projection equipment invention 67 is further set to the monitor approach of invention 60 thru/or one projection equipment of 66,
Said predetermined notice is characterized by including the event log of the abnormality information about the abnormalities of said projection means, and said projection equipment.
[0114]
Thereby, effectiveness equivalent to the projection equipment of invention 27 is acquired.
[Invention 68] The monitor approach of the projection equipment invention 68 is further set to the monitor approach of invention 60 thru/or one projection equipment of 67,
Said malfunction detection step is characterized by contrasting said Hara projection image and said real projection image, and detecting the abnormalities of said projection means based on those points of agreement or differences.
[0115]
Thereby, effectiveness equivalent to the projection equipment of invention 28 is acquired.
[Invention 69] The monitor approach of the projection equipment invention 69 is further set to the monitor approach of the projection equipment invention 68,
Said malfunction detection step is characterized by contrasting the projection timing and this timing, or the thing mostly incorporated at said image taking-in step in this timing for said Hara projection image and the real projection image projected based on the original projection image concerned, and detecting the abnormalities of said projection means based on the difference which detected and detected those differences.
[0116]
Thereby, effectiveness equivalent to the projection equipment of invention 29 is acquired.
[Invention 70] The monitor approach of the projection equipment invention 70 is further set to the monitor approach of the projection equipment invention 68,
Said malfunction detection step is a signal inputted into said projection means. The projection picture signal which can constitute said Hara projection image, In said image taking-in step Contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated at said image taking-in step from this timing for the real projection image which is the signal outputted and was projected based on the original projection image concerned, and those differences are detected. It is characterized by detecting the abnormalities of said projection means based on the detected difference.
[0117]
Thereby, effectiveness equivalent to the projection equipment of invention 30 is acquired.
[Invention 71] The monitor approach of the projection equipment invention 71 is further set to the

monitor approach of the projection equipment invention 68,
Said Hara projection image consists of a original projection image of different two or more colors,
Said real projection image comes to compound the real projection image of said two or more colors projected based on said each **** projection image, respectively,
Said each **** projection image is captured using the monochrome sensor which said each **** projection image was made to correspond, and was formed so that it might become possible for said image taking-in step to capture said each **** projection image,
Said malfunction-detection step is characterized by to detect the abnormalities of said projection means based on the difference which detected those differences for every projection image of said which carries out color correspondence by contrasting the projection timing and this timing, or the thing mostly incorporated by said monochrome sensor to this timing for said Hara projection image and the real projection image projected based on the original projection image concerned, and was detected.
[0118]
Thereby, effectiveness equivalent to the projection equipment of invention 31 is acquired.
[Invention 72] The monitor approach of the projection equipment invention 72 is further set to the monitor approach of the projection equipment invention 68,
Said Hara projection image consists of a original projection image of different two or more colors,
Said real projection image comes to compound the real projection image of said two or more colors projected based on said each **** projection image, respectively,
Said each **** projection image is captured using the monochrome sensor which said each **** projection image was made to correspond, and was formed so that it might become possible for said image taking-in step to capture said each **** projection image,
Said malfunction detection step is a signal inputted into said projection means for said every projection image which carries out color correspondence. The projection picture signal which can constitute said Hara projection image, Contrast the taking-in picture signal which can constitute mostly the projection timing and this timing, or the thing incorporated by said monochrome sensor from this timing for the real projection image which is the signal outputted from said monochrome sensor, and was projected based on the original projection image concerned, and those differences are detected. It is characterized by detecting the abnormalities of said projection means based on the detected difference.
[0119]
Thereby, effectiveness equivalent to the projection equipment of invention 32 is acquired.
[Invention 73] The monitor approach of the projection equipment invention 73 is further set to the monitor approach of one projection equipment of the invention 71 and 72,
Said projection means includes an image display means to display an image based on a projection picture signal or projection image information, and the light source which projects the image displayed with said image display means on a screen by the exposure of light,
It is characterized by judging with said light source of said malfunction detection step being unusual when a predetermined threshold is exceeded for said every projection image which carries out color correspondence.
[0120]
Thereby, effectiveness equivalent to the projection equipment of invention 33 is acquired.
[Invention 74] The monitor approach of the projection equipment invention 74 is further set to the monitor approach of invention 60 thru/or one projection equipment of 73,
Said malfunction detection step is characterized by judging with said projection means being unusual when the difference which computed difference with the pixel value of said predetermined location and the adjoining location, and was computed exceeds a predetermined threshold the pixel value of a predetermined location, and among said real projection images among said real projection images.
[0121]
Thereby, effectiveness equivalent to the projection equipment of invention 34 is acquired.
[Invention 75] The monitor approach of the projection equipment invention 75 is further set to the monitor approach of invention 60 thru/or one projection equipment of 74,

Said malfunction detection step is characterized by judging with said projection means being unusual when the difference which computed difference with the pixel value of the location which said predetermined location isolated, and was computed exceeds a predetermined threshold the pixel value of a predetermined location, and among said real projection images among said real projection images.
[0122]
Thereby, effectiveness equivalent to the projection equipment of invention 35 is acquired.
[Invention 76] The monitor approach of the projection equipment invention 76 is further set to the monitor approach of invention 60 thru/or one projection equipment of 75,
Said malfunction-detection step is characterized by to judge with said projection means being unusual when total of the difference which computed difference with the pixel value of the inspection location concerned and the adjoining location, and was computed exceeds a predetermined threshold the pixel value of the inspection location concerned, and among said real projection images among said real projection images about two or more inspection locations among said real projection images.
[0123]
Thereby, effectiveness equivalent to the projection equipment of invention 36 is acquired.
[Invention 77] The monitor approach of the projection equipment invention 77 is further set to the monitor approach of invention 74 thru/or one projection equipment of 76,
Said pixel value is characterized by adding the pixel value which sampled and sampled the pixel value of homotopic over N (N is one or more integers) time to every predetermined spacing deltat from the criteria time of day t.
[0124]
Thereby, effectiveness equivalent to the projection equipment of invention 37 is acquired.
[Invention 78] The monitor approach of the projection equipment invention 78 is further set to the monitor approach of invention 60 thru/or one projection equipment of 77,
Said image taking-in step inputs the same signal as the timing signal which said projection means inputs, and is characterized by synchronizing the projection timing of said projection means, and the taking-in timing which captures said real projection image based on said timing signal.
[0125]
Thereby, effectiveness equivalent to the projection equipment of invention 38 is acquired.
[Best Mode of Carrying Out the Invention]
[0126]
Hereafter, the gestalt of operation of this invention is explained, referring to a drawing. Drawing 1 thru/or drawing 5 are drawings showing the supervisor of the monitoring system of the projection equipment concerning this invention, projection equipment, and projection equipment, and the gestalt of implementation of the monitor approach of projection equipment in a list.
The gestalt of this operation detects the abnormalities which generated the monitor approach of projection equipment in projection equipment 100 as shown in drawing 1 in the supervisor of the monitoring system of the projection equipment concerning this invention, projection equipment, and projection equipment, and a list, and applies them about the case where it notifies in the monitor center 200.
[0127]
First, the configuration of the network system which applies this invention is explained, referring to drawing 1 . Drawing 1 is the block diagram showing the configuration of the network system which applies this invention.
As shown in drawing 1 , the projection equipment 100 which projects an image, and the monitor center 200 which supervises projection equipment 100 are connected to the screen 110 at the Internet 199. In addition, although only one set is illustrating projection equipment 100 in order to make an understanding of invention easy, two or more projection equipments 100 are connected to the Internet 199 in fact.
[0128]
Next, the configuration of projection equipment 100 is explained to a detail, referring to drawing 2 .

Drawing 2 is the block diagram showing the configuration of projection equipment 100.
The projection section 120 which projects an image on a screen 110 based on the projection picture signal given from PC which is not illustrated as projection equipment 100 is shown in drawing 2 , The image sensor 130 which captures the projection image projected on the screen 110, It consists of the malfunction detection section 140 which detects the abnormalities of the projection section 120 based on a projection picture signal and the image pick-up signal from an image sensor 130, and the notice section 150 which performs a predetermined notice when abnormalities are detected in the malfunction detection section 140. In addition, the ideal projection image constituted by the projection picture signal shall be hereafter called original projection image, the projection image actually projected on the screen 110 shall be called real projection image, and they shall be distinguished.
[0129]
Here, the abnormalities of the projection section 120 show degradation of a lamp piece, the point defect of light PARUBU, the line defect of light PARUBU, an irregular color, quantity of light unevenness, and a lamp etc.
Next, the internal structure of the projection section 120 is explained to a detail, referring to drawing 3 and drawing 4 . Drawing 3 is the top view showing the internal structure of the projection section 120. Drawing 4 is the side elevation showing the internal structure of the projection section 120.
[0130]
In drawing 3 and drawing 4 , it is condensed in the optical system which consists of a lens 21, a heat ray cut-off filter 22, a reflecting mirror 23, and a lens 24, and the light emitted from the light source 20 which consisted of a tungsten halogen lamp, a metal halide electric bulb, and a reflecting plate obtains the light as a cheek parallel light. Forced discharge of the heating value generated from the light source 20 is carried out by the heat dissipation fan 34.
The spectrum of the light irradiated from an illumination-light study system is carried out to red and green and blue three primary colors with a dichroic mirror. In the example, the spectrum of the blue is carried out by the blue reflective mirror 25, and the blue display panel 31 is illuminated through the blue reflective mirror 28. The spectrum of the red is carried out by the red reflective mirror 26, and the red display panel 32 is illuminated. A green light which remained illuminates the green display panel 33. The image displayed on the green display panel 33 results in the projection lens 13 through the green reflective mirror 27 and the green reflective mirror 30, and the display image of the red display panel 32 results in the projection lens 13 through the red reflective mirror 29. The display image of the blue display panel 31 penetrates the red reflective mirror 29 and the green reflective mirror 30, and results in the projection lens 13.
[0131]
The display panel of three sheets is arranged so that the optical path from the projection lens 13 may become the same, each display image is compounded in the projection lens 13 with a dichroic mirror, and expansion projection is carried out.
35 is a foot and adjusts a projection include angle. 36 is the circuit section and a control circuit and a power circuit are arranged.
[0132]
Here, since the configuration of the real projection image captured by the image sensor 130 changes with the include angles which capture the real projection image projected in the projection section 120, in order to make it not change the configuration of a real projection image, as for the location in which an image sensor 130 is attached, it is desirable to attach in right above [of the projection lens 13] near the projection lens 13.
On the other hand, return and an image sensor 130 become drawing 2 from a two-dimensional area sensor, an area image is captured from the real projection image projected in the projection section 120, and the image pick-up signal which can constitute the captured real projection image is outputted to the malfunction detection section 140. Moreover, the timing signal inputted into the projection section 120 is inputted, and the projection timing of the projection section 120 and the taking-in timing of an image sensor 130 are synchronized based on the inputted timing signal.

[0133]
The notice section 150 transmits the abnormality information the projection section 120 indicates the notice of an unusual purport, and the contents of the inputted abnormality signal to be, and the event log of projection equipment 100 to the monitor center 200, when the abnormality signal from the malfunction detection section 140 is inputted.
The malfunction detection section 140 has the same function as the common computer which carried out the bus connection of CPU, ROM, RAM, I/F, etc., is constituted, starts the predetermined program stored in the predetermined field of ROM, and performs malfunction detection processing shown in the flow chart of drawing 5 according to the program. Drawing 5 is a flow chart which shows malfunction detection processing.
[0134]
Malfunction detection processing is processing which detects the abnormalities of the projection section 120 based on a projection picture signal and the image pick-up signal from an image sensor 130, and if it performs in CPU, as shown in drawing 5 , it will shift to step S100 first.
Initialization processing is performed at step S100. Specifically the horizontal number Xmax of pixels of a original projection image and a real projection image is set up, the number Ymax of pixels of the perpendicular direction of a original projection image and a real projection image is set up, and thresholds Pth1, Pth2, Pth3, and Pth4 are set up. Moreover, reservation and zero setup of the 1-dimensional variables X, Y, t, delta Pir, delta Pr1, delta Pr2, and delta Prs are performed, the reservation and zero setup of the two-dimensional variables Pi (Xmax, Ymax) and Pr (Xmax, Ymax) for storing a pixel value are performed, and the reservation of the three-dimension variable Pr (Xmax, Ymax, tmax) and zero setup for storing the addition value of a pixel value are performed.
[0135]
Subsequently, it shifts to step S102 and a original projection image is constituted based on the projection picture signal inputted from the projection section 120, the pixel value of the inspection location which shifts to step S104 and is pinpointed with the value of Variables X and Y among the constituted original projection images is sampled, and the sampled pixel value is stored in Variable Pi (X, Y). This sampling is performed at intervals of delta t seconds which is the period with which malfunction detection processing is performed.
[0136]
Subsequently, it shifts to step S106 and a real projection image is constituted based on the image pick-up signal inputted from the image sensor 130, the pixel value of the inspection location which shifts to step S108 and is pinpointed with the value of Variables X and Y among the constituted real projection images is sampled, and the sampled pixel value is stored in Variable Pr (X, Y). This sampling is performed at intervals of delta t seconds which is the period with which malfunction detection processing is performed.
[0137]
Subsequently, it shifts to step S110 and every deltat is covered towards the past by the bottom type (1) in N (N is one or more integers) time from current time t, the pixel value of the inspection location pinpointed with the value of Variables X and Y among real projection images is added, and the computed addition value is stored in Variable Pr (X, Y, t).

$$Pr(X, Y, t) = Pr(X, Y, t-1) + Pr(X, Y) \quad -- (1)$$

Subsequently, it shifts to step S112, and the difference of the pixel value Pi (X, Y) of the inspection location pinpointed by the bottom type (2) with the value of Variables X and Y among original projection images and the pixel value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images (X, Y) is computed, and the computed difference is stored in variable deltaPir.

$$deltaPir = |Pi(X, Y) - Pr(X, Y)| \quad -- (2)$$

When it shifts to step S114, and it judges whether the value of variable deltaPir is larger than a threshold Pth1 and it is judged as the value of variable deltaPir being one or less threshold Pth, subsequently, (No) The addition value Pr of the inspection location which shifts to step S116 and is pinpointed by the bottom type (3) with the value of Variables X and Y among real projection images (X, Y, t) Difference with the addition value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images and the adjoining location (X-1, Y, t) is computed, and the computed difference is stored in variable deltaPr1.

deltaPr1=|Pr(X, Y, t)-Pr(X-1, Y, t)| -- (3)
Subsequently, it shifts to step S118 and judges whether the value of variable deltaPr1 is larger than a threshold Pth2.
[0138]
Here, as an addition value Pr of the adjoining location, Pr (X-1, Y, t) is mentioned as an example, and variable deltaPr1 is explained. As an addition value Pr of the adjoining location, Pr (X-1, Y, t), Pr (X+1, Y, t), Pr (X, Y-1, t), Pr (X, Y+1, t), Pr (X-1, Y-1, t), From the ability of the addition value Pr of the adjoining location of eight pieces of Pr (X+1, Y-1, t), Pr (X-1, Y+1, t), and Pr (X+1, Y+1, t) to be considered The addition value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images (X, Y, t) As opposed to each variable deltaPr1 which computed difference with the addition value Pr of the location of eight pieces contiguous to the inspection location pinpointed with the value of Variables X and Y among real projection images, respectively, stored each computed difference in variable deltaPr1, and stored it It judges whether the value of variable deltaPr1 is larger than a threshold Pth2. Or variable deltaPr1 is computed and judged to the addition value Pr of the location where predetermined [of the eight pieces] adjoined.
[0139]
When it judges with the value of variable deltaPr1 being two or less threshold Pth, (No) The addition value Pr of the inspection location which shifts to step S120 and is pinpointed by the bottom type (4) with the value of Variables X and Y among real projection images (X, Y, t) With the inspection location pinpointed with the value of Variables X and Y among real projection images, difference with the addition value Pr of the isolated location (X-k, Y, t) is computed, and the computed difference is stored in variable deltaPr2.

deltaPr2=|Pr(X, Y, t)-Pr(X-k, Y, t)| -- (4)

Subsequently, it shifts to step S122 and judges whether the value of variable deltaPr2 is larger than a threshold Pth3. Here, k is two or more values, and is taken as 1/100 or less integral value of the value of the larger one among the number of horizontal pixels, and the number of perpendicular direction pixels.
[0140]
Moreover, as an addition value Pr of the isolated location, Pr (X-k, Y, t) is mentioned as an example, and variable deltaPr2 is explained here. As an addition value Pr of the isolated location, Pr (X-k, Y, t), Pr (X+k, Y, t), Pr (X, Y-k, t), Pr (X, Y+k, t), Pr (X-k, Y-k, t), From the ability of the addition value Pr of the isolated location of eight pieces of Pr (X+k, Y-k, t), Pr (X-k, Y+k, t), and Pr (X+k, Y+k, t) to be considered The addition value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images (X, Y, t) As opposed to each variable deltaPr2 which computed difference with the addition value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images, and the isolated location of eight pieces, respectively, stored each computed difference in variable deltaPr2, and stored it It judges whether the value of variable deltaPr2 is larger than a threshold Pth3. Or variable deltaPr2 is computed and judged to the addition value Pr of the location which predetermined [of the eight pieces] isolated.
[0141]
When it judges with the value of variable deltaPr2 being three or less threshold Pth, (No) shifts to step

S124 and stores in variable deltaPrs the total which computed and computed total of variable deltaPr1 by the bottom type (5).

delta Prs=delta Prs+delta Pr1 -- (5)

Subsequently, it shifts to step S126, what added "1" to the value of Variable X is set up as a new value of Variable X, and it shifts to step S128, and when it judges whether the value of Variable X is more than the number Xmax of the level maximum pixels and judges with the value of Variable X being more than the number Xmax of the level maximum pixels (Yes), it shifts to step S130.
[0142]
At step S130, set "0" as Variable X and it shifts to step S132. Set up what added "1" to the value of Variable Y as a new value of Variable Y, and it shifts to step S134. When it judges whether the value of Variable Y is more than the number Ymax of the perpendicular maximum pixels and judges with the value of Variable Y being more than the number Ymax of the perpendicular maximum pixels (Yes), it shifts to step S136.
At step S136, when it judges whether the value of variable deltaPrs is larger than a threshold Pth4 and judges with the value of variable deltaPrs being four or less threshold Pth, (No) shifts to step S138, sets up what added "1" to the value of Variable t as a new value of Variable t, ends a series of processings, and is returned to the original processing.
[0143]
the time (Yes) of on the other hand judging with the value of variable deltaPrs being larger than a threshold Pth4 at step S136 -- step S140 -- shifting -- a real projection image -- setting -- the difference of the addition value of contiguity pixels -- total outputs the abnormality signal which shows an unusual purport to the notice section 150, and shifts to step S138.
The addition value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images here (X, Y, t) Total of variable deltaPr1 is computed about each of variable deltaPr1 which computed difference with the addition value Pr of the location of eight pieces contiguous to the inspection location pinpointed with the value of Variables X and Y among real projection images, respectively. Each computed total is stored in variable deltaPrs, and step S124 thru/or S136 are performed to each stored variable deltaPrs. Or variable deltaPrs is computed and judged to the addition value Pr of the location where predetermined [of the eight pieces] adjoined.
[0144]
When it judges with on the other hand the value of Variable X being under the number Xmax of the level maximum pixels at (No) and step S128 when it judges with the value of Variable Y being under the number Ymax of the perpendicular maximum pixels at step S134, each (No) shifts to step S102.
On the other hand, at step S122, when it judges with the value of variable deltaPr2 being larger than a threshold Pth3 (Yes), it shifts to step S142, and in a real projection image, the difference of the addition value of isolation pixels outputs the abnormality signal which shows an unusual purport to the notice section 150, and shifts to step S138.
[0145]
On the other hand, at step S118, when it judges with the value of variable deltaPr1 being larger than a threshold Pth2 (Yes), it shifts to step S144, and in a real projection image, the difference of the addition value of contiguity pixels outputs the abnormality signal which shows an unusual purport to the notice section 150, and shifts to step S138.
On the other hand, at step S114, when it judges with the value of variable deltaPir being larger than a threshold Pth1 (Yes), it shifts to step S146, and the abnormality signal which shows a purport with the difference which contrasts a original projection image and a real projection image, and exceeds the predetermined range is outputted to the notice section 150, and it shifts to step S138.
[0146]
Next, actuation of the gestalt of this operation is explained.
With projection equipment 100, if a projection picture signal is inputted, based on the inputted

projection picture signal, an image will be projected on a screen 110 by the projection section 120. This projection timing is determined based on a timing signal.
Moreover, the image pick-up signal which an area image is captured by the image sensor 130 and can constitute the captured real projection image from a real projection image projected in the projection section 120 with it is outputted to the malfunction detection section 140. This taking-in timing is determined based on a timing signal. Since this timing signal is inputted also into the projection section 120 at this time, the projection timing of the projection section 120 and the taking-in timing of an image sensor 130 will synchronize.
[0147]
Subsequently, in the malfunction detection section 140, if a projection picture signal and an image pick-up signal are inputted First, based on the inputted projection picture signal, a original projection image is constituted through steps S102 and S104. The pixel value of the inspection location pinpointed with the value of Variables X and Y among the constituted original projection images is sampled, and the sampled pixel value is stored in Variable Pi (X, Y). Moreover, through steps S106 and S108, a real projection image is constituted based on the inputted image pick-up signal, the pixel value of the inspection location pinpointed with the value of Variables X and Y among the constituted real projection images is sampled, and the sampled pixel value is stored in Variable Pr (X, Y). And through step S110, every deltat is covered towards the past by the upper type (1) in N time from current time t, the pixel value of the inspection location pinpointed with the value of Variables X and Y among real projection images is added, and the computed addition value is stored in Variable Pr (X, Y, t).
[0148]
Thus, if the pixel values Pi (X, Y) and Pr (X, Y) of an inspection location are sampled and the addition value Pr of an inspection location (X, Y, t) is computed, 1st malfunction detection processing will be performed through steps S112 and S114. In the 1st malfunction detection processing, the difference of the pixel value Pi (X, Y) of the inspection location pinpointed by the upper type (2) with the value of Variables X and Y among original projection images and the pixel value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images (X, Y) is computed first, and the computed difference is stored in variable deltaPir. And if the value of variable deltaPir is larger than a threshold Pth1, since it will judge that the projection section 120 is unusual, the abnormality signal which shows a purport with the difference which contrasts a original projection image and a real projection image, and exceeds the predetermined range is outputted to the notice section 150 through step S146. By 1st malfunction detection processing, when the line defect has occurred in the real projection image, the abnormality can be detected.
[0149]
In the notice section 150, an input of an abnormality signal transmits the abnormality information the projection section 120 indicates the notice of an unusual purport, and the contents of the inputted abnormality signal to be, and the event log of projection equipment 100 to the monitor center 200.
Moreover, with projection equipment 100, when abnormalities are not detected by the 1st malfunction detection processing, 2nd malfunction detection processing is performed through steps S116 and S118. The addition value Pr of the inspection location first pinpointed by the upper type (3) with the value of Variables X and Y among real projection images in the 2nd malfunction detection processing (X, Y, t) Difference with the addition value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images and the adjoining location (X-1, Y, t) is computed, and the computed difference is stored in variable deltaPr1. And if the value of variable deltaPr1 is larger than a threshold Pth2, since it will judge that the projection section 120 is unusual, the abnormality signal with which the difference of the addition value of contiguity pixels shows an unusual purport in a real projection image is outputted to the notice section 150 through step S144. The abnormality can be detected, when the line defect has occurred in the real projection image by 2nd malfunction detection processing, or when the irregular color has occurred in the real projection image. In addition, about the processing after the notice section 150, it is the same as that of the above.
[0150]

Moreover, with projection equipment 100, when abnormalities are not detected by the 2nd malfunction detection processing, 3rd malfunction detection processing is performed through steps S120 and S122. The addition value Pr of the inspection location first pinpointed by the upper type (4) with the value of Variables X and Y among real projection images in the 3rd malfunction detection processing (X, Y, t) With the inspection location pinpointed with the value of Variables X and Y among real projection images, difference with the addition value Pr of the isolated location (X-k, Y, t) is computed, and the computed difference is stored in variable deltaPr2. And if the value of variable deltaPr2 is larger than a threshold Pth3, since it will judge that the projection section 120 is unusual, the abnormality signal with which the difference of the addition value of contiguity pixels shows an unusual purport in a real projection image is outputted to the notice section 150 through step S142. The abnormality can be detected, when the line defect has occurred in the real projection image by 3rd malfunction detection processing, or when the irregular color has occurred in the real projection image. In addition, about the processing after the notice section 150, it is the same as that of the above.

[0151]

Moreover, with projection equipment 100, when abnormalities are not detected by the 3rd malfunction detection processing, the total by which total of variable deltaPr1 was computed by the upper type (5), and it was computed is stored in variable deltaPrs through step S124.

1st malfunction detection processing, 2nd malfunction detection processing, and 3rd malfunction detection processing are performed about all the horizontal pixels of the maximum upper case among a original projection image and a real projection image. If abnormalities are not detected in addition about them, it will be carried out about all the horizontal pixels of the 2nd step, and will be carried out in the same way about other pixels. And when 1st malfunction detection processing, 2nd malfunction detection processing, and 3rd malfunction detection processing are performed about all the pixels of a original projection image and a real projection image and abnormalities are detected about those neither, 4th malfunction detection processing is performed through step S136. in the 4th malfunction detection processing, if the value of variable deltaPrs is larger than a threshold Pth4, since it will judge that the projection section 120 is unusual, pass step S140 -- a real projection image -- setting -- the difference of the addition value of contiguity pixels -- the abnormality signal with which total shows an unusual purport is outputted to the notice section 150. By 4th malfunction detection processing, when the irregular color has occurred in the real projection image, the abnormality can be detected. In addition, about the processing after the notice section 150, it is the same as that of the above.

[0152]

By the above, malfunction detection processing is completed about one screen of a original projection image and a real projection image. After that, it is the same point as the above and malfunction detection processing will be performed by every predetermined period deltat.

With the gestalt of this operation, thus, projection equipment 100 The projection section 120 which projects an image on a screen 110, and the image sensor 130 which captures the real projection image projected in the projection section 120, The malfunction detection section 140 which detects the abnormalities of the projection section 120 based on the real projection image captured with the image sensor 130, Having the notice section 150 which performs a predetermined notice, when abnormalities are detected in the malfunction detection section 140, the malfunction detection section 140 detects the abnormalities of the projection section 120 based on the original projection image which should be projected in the projection section 120, and the real projection image captured with the image sensor 130.

[0153]

Thereby, since the abnormalities of the projection section 120 are detected based on a original projection image and a real projection image, as compared with the former, the fault on the display which appears on a projection screen is detectable on level more detailed than not only the case of not switching [of the light source 20] on the light but the case where the line defect has occurred in the real projection image etc. Moreover, it can grasp that abnormalities occurred in the projection section 120 by predetermined notice.

Furthermore, with the gestalt of this operation, the notice section 150 performs a predetermined notice to the monitor center 200, when abnormalities are detected in the malfunction detection section 140.
[0154]
Thereby, in the monitor center 200, it can grasp that abnormalities occurred to projection equipment 100 by predetermined notice.
Furthermore, with the gestalt of this operation, an image sensor 130 is a two-dimensional area sensor.
Thereby, since an area image is captured from a real projection image, as compared with the case where a 1-dimensional line sensor is used, the fault on the display which appears on a projection screen can be detected comparatively certainly.
[0155]
Furthermore, with the gestalt of this operation, the notice section 150 transmits the abnormality information the projection section 120 indicates the notice of an unusual purport, and the contents of the inputted abnormality signal to be, and the event log of projection equipment 100 to the monitor center 200, when the abnormality signal from the malfunction detection section 140 is inputted.
Thereby, the abnormality information which abnormalities generated in the projection section 120 concerning the abnormalities of the projection section 120 remarkably, and the operation hysteresis of projection equipment 100 can be grasped by predetermined notice.
[0156]
Furthermore, with the gestalt of this operation, the malfunction detection section 140 contrasts a original projection image and a real projection image, and detects the abnormalities of the projection section 120 based on those differences.
Thereby, the fault on the display which appears on a projection screen is detectable on still more detailed level.
Furthermore, with the gestalt of this operation, the malfunction detection section 140 contrasts the projection timing and this timing, or the thing mostly incorporated with the image sensor 130 to this timing for a original projection image and the real projection image projected based on the original projection image, and detects the abnormalities of the projection section 120 based on the difference which detected and detected those differences.
[0157]
Thereby, the fault on the display which appears on a projection screen can be detected comparatively correctly.
With the gestalt of this operation, furthermore, the malfunction detection section 140 The addition value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images (X, Y, t) difference with the addition value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images, and the adjoining location (X-1, Y, t) -- the difference which computed and computed deltaPr1 -- when deltaPr1 exceeds the predetermined threshold Pth2, the projection section 120 judges with it being unusual.
[0158]
Thereby, since the abnormalities of the projection section 120 are detected based on the difference of contiguity pixels, the fault on the display which appears on a projection screen can be detected still more correctly.
Furthermore, with the gestalt of this operation, it judges with the malfunction detection section 140 having the unusual projection section 120, when the total which computed total of variable deltaPr1 and computed exceeds the predetermined threshold Pth4.
[0159]
Since this detects the abnormalities of the projection section 120 based on total of the difference of the computed contiguity pixels about two or more inspection locations, the fault on the display which appears on a projection screen can be detected still more correctly.
Furthermore, with the gestalt of this operation, the same timing signal is inputted into the projection section 120 and an image sensor 130, and the projection timing of the projection section 120 and the taking-in timing of an image sensor 130 are synchronized based on a timing signal.

[0160]
This becomes possible to capture the real projection image corresponding to a original projection image, and the fault on the display which appears on a projection screen can be detected still more correctly.
In the gestalt of the above-mentioned implementation the projection section 120 It corresponds to invention 2 4 and 8 10 and 15 17, 19, 20, 21, 23 and 27 29 and 34 36, 38, 39, 40, 41, 43 and 47 49 and 54 56, 58, 59, 60, 61, 63 and 67 69 and 74 thru/or 76, or the projection means of 78. An image sensor 130 corresponds to invention 2, 4, 7, 10, 19, 20, 21, 26, 29, 38, 40, 41, 46, and 49 or the image taking-in means of 58, and taking in by the image sensor 130 supports invention 60, 61, 66, and 69 or the image taking-in step of 78. Moreover, the malfunction detection section 140 corresponds to the malfunction detection means of invention 2, 4, 9, 10, and 15 17, 20, 21, 28, 29 and 34 thru/or 36, 40, 41, 48 and 49 or 54 thru/or 56. The detection by the malfunction detection section 140 corresponds to the malfunction detection step of invention 60, 61, 68, and 69 or 74 thru/or 76, and the notice section 150 supports invention 2, 4, 20, 21, and 40 or the notice means of abnormalities of 41.
[0161]
Moreover, in the gestalt of the above-mentioned implementation, the notice by the notice section 150 supports invention 60 or the notice step of abnormalities of 61.
In addition, in the gestalt of the above-mentioned implementation, although constituted using a two-dimensional area sensor as an image sensor 130, it can also constitute not only using this but using a 1-dimensional line sensor. Usually, although it generates horizontally, if initial failure's line defect is removed, the perpendicular direction of a real projection image and possibility of a line defect that a vertical line defect will occur are high. Therefore, it is desirable to form a 1-dimensional line sensor so that the horizontal Rhine image may be captured from a real projection image.
[0162]
Thereby, since a 1-dimensional line sensor is used, it can constitute comparatively cheaply. Moreover, since the probability of occurrence can detect the line defect of a comparatively high perpendicular direction as compared with the case where a 1-dimensional line sensor is only formed, the fault on the display which appears on a projection screen can be detected comparatively certainly.
In this case, an image sensor 130 corresponds to invention 5 and 24 or the image taking-in means of 44, and the incorporation by the image sensor 130 supports the image taking-in step of invention 64.
[0163]
In the gestalt of the above-mentioned implementation moreover, the malfunction detection section 140 Contrast the projection timing and this timing, or the thing mostly incorporated with the image sensor 130 to this timing for a original projection image and the real projection image projected based on the original projection image, and those differences are detected. It constituted so that the abnormalities of the projection section 120 might be detected based on the detected difference, but it can also constitute so that not only this but a projection picture signal and an image pick-up signal may be contrasted and the abnormalities of the projection section 120 may be detected based on those differences. The malfunction detection section 140 is specifically a signal inputted into the projection section 120. The projection picture signal which can constitute a original projection image, Contrast the image pick-up signal which can constitute mostly the projection timing and this timing, or the thing incorporated with the image sensor 130 from this timing for the real projection image which is the signal outputted from an image sensor 130, and was projected based on the original projection image, and those differences are detected. The abnormalities of the projection section 120 are detected based on the detected difference.
[0164]
Thereby, the fault on the display which appears on a projection screen can be detected comparatively correctly.
In this case, the projection section 120 corresponds to invention 11, 30, and 50 or the projection means of 70, an image sensor 130 corresponds to invention 11 and 30 or the image taking-in means of 50, and the incorporation by the image sensor 130 supports the image taking-in step of invention 70. Moreover, the malfunction detection section 140 corresponds to invention 11 and 30 or the malfunction detection means of 50, the detection by the malfunction detection section 140 corresponds to the malfunction

detection step of invention 70, and the image pick-up signal is equivalent to invention 11, 30, and 50 or the taking-in picture signal of 70.
[0165]
Moreover, in the gestalt of the above-mentioned implementation, projection equipment 100 incorporates what compounded the real projection image of three colors with an image sensor 130, and although it was constituted so that the abnormalities of the projection section 120 might be detected based on the captured real projection image It is desirable to constitute so that the real projection image of three colors may be captured with an image sensor 130 from a viewpoint which performs not only this but more exact detection, respectively and the abnormalities of the projection section 120 may be detected based on each captured **** projection image. Specifically, it can constitute as follows.
[0166]
It is the monochrome sensor which each **** projection image was made to correspond and was formed [1st] so that it might become possible for an image sensor 130 to capture each **** projection image. The malfunction detection section 140 Contrast the projection timing and this timing, or the thing mostly incorporated by the monochrome sensor to this timing for the real projection image which carries out each color correspondence and which was projected based on a original projection image and its original projection image for every projection image, and those differences are detected. The abnormalities of the projection section 120 are detected based on the detected difference.
[0167]
Since this detects the abnormalities of the projection section 120 for every projection image which carries out color correspondence, the fault on the display which appears on a projection screen can be detected still more correctly.
In this case, the projection section 120 corresponds to invention 12, 31, and 51 or the projection means of 71, an image sensor 130 corresponds to invention 12 and 31 or the image taking-in means of 51, and the incorporation by the image sensor 130 supports the image taking-in step of invention 71. Moreover, the malfunction detection section 140 corresponds to invention 12 and 31 or the malfunction detection means of 51, and the detection by the malfunction detection section 140 supports the malfunction detection step of invention 71.
[0168]
It is the monochrome sensor which each **** projection image was made to correspond and was formed [2nd] so that it might become possible for an image sensor 130 to capture each **** projection image. The malfunction detection section 140 It is the signal inputted into the projection section 120 for every projection image which carries out color correspondence. The projection picture signal which can constitute a original projection image, Contrast the image pick-up signal which can constitute mostly the projection timing and this timing, or the thing incorporated by the monochrome sensor from this timing for the real projection image which is the signal outputted from a monochrome sensor and was projected based on the original projection image, and those differences are detected. The abnormalities of the projection section 120 are detected based on the detected difference.
[0169]
Since this detects the abnormalities of the projection section 120 for every projection image which carries out color correspondence, the fault on the display which appears on a projection screen can be detected still more correctly.
In this case, the projection section 120 corresponds to invention 13, 32, and 52 or the projection means of 72, an image sensor 130 corresponds to invention 13 and 32 or the image taking-in means of 52, and the incorporation by the image sensor 130 supports the image taking-in step of invention 72. Moreover, the malfunction detection section 140 corresponds to invention 13 and 32 or the malfunction detection means of 52, the detection by the malfunction detection section 140 corresponds to the malfunction detection step of invention 72, and the image pick-up signal is equivalent to invention 13, 32, and 52 or the taking-in picture signal of 72.
[0170]
To the 3rd, it judges with the malfunction detection section 140 having the unusual light source 20,

when the difference which exceeds the predetermined range for every projection image which carries out color correspondence is detected in the 1st and 2nd configurations.
Thereby, it is detectable that the light source 20 is unusual only by contrasting a original projection image and a real projection image.
In this case, the projection section 120 corresponds to invention 14, 33, and 53 or the projection means of 73, the malfunction detection section 140 corresponds to invention 14 and 33 or the malfunction detection means of 53, and the incorporation by the image sensor 130 supports the image taking-in step of invention 73. Moreover, display panels 31-33 support invention 14, 33, and 53 or the image display means of 73.
[0171]
In the gestalt of the above-mentioned implementation moreover, the notice section 150 Although it constituted so that the projection section 120 might transmit the abnormality information which shows the notice of an unusual purport, and the contents of the inputted abnormality signal, and the event log of projection equipment 100 to the monitor center 200 when the abnormality signal from the malfunction detection section 140 was inputted It can also constitute so that those information may be offered not only according to this but according to access from the monitor center 200. Specifically, the notice section 150 provides the monitor center 200 with the saved malfunction detection result, when the malfunction detection result in the malfunction detection section 140 is saved and there is access from the monitor center 200.
[0172]
Even if it is such a configuration, effectiveness equivalent to the gestalt of the above-mentioned implementation is acquired.
In this case, the projection section 120 corresponds to the projection means of invention 22, 42, or 62, an image sensor 130 corresponds to the image taking-in means of invention 22 or 42, taking in by the image sensor 130 corresponds to the image taking-in step of invention 62, and the malfunction detection section 140 supports the malfunction detection means of invention 22 or 42. Moreover, the detection by the malfunction detection section 140 corresponds to the malfunction detection step of invention 62, the notice section 150 corresponds to the detection result offer means of invention 22 or 42, and the notice by the notice section 150 supports the detection result offer step of invention 62.
[0173]
Moreover, in the gestalt of the above-mentioned implementation, it constituted so that a original projection image and a real projection image might be contrasted and the abnormalities of the projection section 120 might be detected based on those differences, but the malfunction detection section 140 can also be constituted so that not only this but a original projection image and a real projection image may be contrasted and the abnormalities of the projection section 120 may be detected based on those points of agreement.
Moreover, in the gestalt of the above-mentioned implementation, although the projection picture signal constituted the original projection image, not only this but projection image information can also constitute it. In this case, from PC etc., projection image information can come to hand beforehand, and can be created.
[0174]
Moreover, in the gestalt of the above-mentioned implementation, it constituted so that malfunction detection processing shown in the flow chart of drawing 5 might be performed, but it can also constitute so that malfunction detection processing shown in the flow chart of not only this but drawing 6 may be performed. Drawing 6 is a flow chart which shows the malfunction detection processing in the case of inspecting by projecting a calibration screen.
If this malfunction detection processing is performed in CPU30, as shown in drawing 6 , it will shift to step S200 first.
[0175]
At step S200, it initializes and shifts to step S202, a calibration screen is projected in the projection section 120, and it shifts to step S204, and the pixel value which sampled and sampled the pixel value

about each pixel of a real projection image is saved as a reference value, and it shifts to step S206.
At step S206, predetermined time standby is carried out and it shifts to step S208, and malfunction detection processing shown in the flow chart of drawing 5 and same processing are performed, and it shifts to step S206.
[0176]
Moreover, in the gestalt of the above-mentioned implementation, it constituted so that malfunction detection processing shown in the flow chart of drawing 5 might be performed, but it can also constitute so that malfunction detection processing shown in the flow chart of not only this but drawing 7 may be performed. Drawing 7 is a flow chart which shows the malfunction detection processing in the case of inspecting by projecting a calibration screen as some real projection images.
If this malfunction detection processing is performed in CPU30, as shown in drawing 7 , it will shift to step S300 first.
[0177]
At step S300, it initializes and shifts to step S302, a calibration screen is projected in the projection section 120, and it shifts to step S304, and the pixel value which sampled and sampled the pixel value about each pixel of a real projection image is saved as a reference value, and it shifts to step S306.
At step S306, predetermined time standby is carried out, it shifts to step S308, some screens for projecting a calibration screen are chosen, and it shifts to step S310, and a calibration screen is projected in the projection section 120 on some selected screens, it shifts to step S312, processing equivalent to the malfunction detection processing shown in the flow chart of drawing 5 is performed, and it shifts to step S306.
[0178]
Moreover, in the gestalt of the above-mentioned implementation, it constituted so that malfunction detection processing shown in the flow chart of drawing 5 might be performed, but it can also constitute so that malfunction detection processing shown in the flow chart of not only this but drawing 8 may be performed. Drawing 8 is a flow chart which shows the malfunction detection processing in the case of inspecting by carrying out color conversion of some real projection images.
If this malfunction detection processing is performed in CPU30, as shown in drawing 8 , it will shift to step S400 first.
[0179]
At step S400, it initializes and shifts to step S402, a calibration screen is projected in the projection section 120, and it shifts to step S404, and the pixel value which sampled and sampled the pixel value about each pixel of a real projection image is saved as a reference value, and it shifts to step S406.
At step S406, predetermined time standby is carried out and it shifts to step S408, some present real projection images are chosen, color transform processing is performed and re-projected, and it shifts to step S410, and processing equivalent to the malfunction detection processing shown in the flow chart of drawing 5 is performed, and it shifts to step S406.
[0180]
In the gestalt of the above-mentioned implementation moreover, the malfunction detection section 140 The addition value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images (X, Y, t) difference with the addition value Pr of the inspection location pinpointed with the value of Variables X and Y among real projection images, and the adjoining location (X-1, Y, t) -- the difference which computed and computed deltaPr1, although it constituted so that the projection section 120 might judge with it being unusual when deltaPr1 exceeded the predetermined threshold Pth2 It can constitute not only in this but as follows.
[0181]
The difference of the addition value Pr of the inspection location pinpointed in the 1st with the value of Variables X and Y among real projection images (X, Y, t) and the addition value Pr of the predetermined time past of the inspection location pinpointed with the value of Variables X and Y among real projection images (X, Y, t-k) is computed, and when the computed difference exceeds a predetermined threshold, the projection section 120 judges with it being unusual.

The pixel value when displaying a criteria color on the pixel of arbitration and its pixel value when displaying this criteria color on the pixel of arbitration in the past are contrasted, those differences are detected and the projection section 120 judges [2nd] that they are unusual based on the detected difference.

[0182]

The pixel value when displaying the color in the pixel of arbitration and the reference value of the same pixel (or pixel group) are contrasted, those differences are detected and the projection section 120 judges [3rd] that they are unusual based on the detected difference. Here, a reference value can come to hand from a network etc.

Moreover, in the gestalt of the above-mentioned implementation, although only one image sensor 130 was formed and constituted, not only this but two or more image sensors 130 can be formed, and it can constitute so that the abnormalities of the projection section 120 may be detected based on the real projection image captured from each image sensor 130.

[0183]

Thereby, the fault on the display which appears on a projection screen can be detected still more certainly.

Moreover, although it constituted in the gestalt of the above-mentioned implementation so that an abnormality signal might be outputted to the notice section 150 when abnormalities were detected by the 1st malfunction detection processing, the 2nd malfunction detection processing, the 3rd malfunction detection processing, or the 4th malfunction detection processing When not only this but abnormalities are detected, it inspects again to the detection pixel of relevance, and when abnormalities are still detected, it can constitute for the first time so that an abnormality signal may be outputted to the notice section 150.

[0184]

Thereby, the fault on the display which appears on a projection screen can be detected still more certainly.

Moreover, in the gestalt of the above-mentioned implementation, the image sensor 130 was formed and constituted so that the real projection image projected on the screen 110 might be captured, but it can also constitute so that the image sensor 130 which consists of a transparence component may be embedded not only this but on the projection lens 13.

Thereby, even if a failure arises between projection equipment 100 and a screen 110, the abnormalities of the projection section 120 are detectable.

[0185]

Moreover, in the gestalt of the above-mentioned implementation, it constituted so that the light from the light source 20 might be condensed on the projection lens 13 as a internal structure of projection equipment 100, but it can also constitute so that not only this but a fork road may be prepared, an image sensor 130 may be formed in a branching place and the abnormalities of the projection section 120 may be detected.

Thereby, even if a failure arises between projection equipment 100 and a screen 110, the abnormalities of the projection section 120 are detectable.

[0186]

Moreover, in the gestalt of the above-mentioned implementation, it constituted so that the abnormalities of the projection section 120 might be detected about the predetermined inspection item defined beforehand, but the malfunction detection section 140 can also be constituted so that the abnormalities of the projection section 120 may be detected not only about this but about the inspection item which received the inspection item from the monitor center 200, and was received.

Thereby, the contents of malfunction detection service can be adjusted by the monitor center 200 side.

[0187]

Moreover, in performing processing shown in the flow chart of drawing 5 in the gestalt of the above-mentioned implementation, the case where the control program beforehand stored in ROM was performed was explained, but from the storage with which the program which showed not only this but

these procedures was memorized, the program is read into RAM and it may be made to perform it. In addition, this is the same also about the case where processing shown in the flow chart of drawing 6 thru/or drawing 8 is performed.

[0188]

Here, storages are a magnetic storage mold / optical reading method storages, such as optical reading method storages, such as magnetic storage mold storages, such as semi-conductor storages, such as RAM and ROM, and FD, HD, and CD, CDV, LD, DVD, and MO, and if it is the storage which can be read by computer regardless of an approach to read magnetic and optical **, they are electronic and a thing containing all storages.

[0189]

Moreover, in the gestalt of the above-mentioned implementation, although the case where the monitor approach of projection equipment was applied to the network system which consists of the Internet 199 was explained to the supervisor of the monitoring system of the projection equipment concerning this invention, projection equipment, and projection equipment, and the list, you may apply to the so-called intranet which communicates with the same method not only as this but the Internet 199. Of course, it is also applicable not only to the network which communicates with the same method as the Internet 199 but the usual network.

[0190]

Moreover, although having applied about the case detect the abnormalities which generated the monitor approach of projection equipment in projection equipment 100 as shown in drawing 1 in the supervisor of the monitoring system of the projection equipment concerning this invention, projection equipment, and projection equipment, and a list, and notify in the monitor center 200 to it, in other cases, in the gestalt of the above-mentioned implementation, it is applicable in the range which does not deviate from the main point of not only this but this invention. For example, without connecting with the monitor center 200, also when projection equipment 100 simple substance detects and notifies abnormalities, it can apply.

[0191]

Moreover, in the gestalt of the above-mentioned implementation, although projection mold projection equipment was mentioned as the example and explained as projection equipment 100, you may be the rear projector which installs a projection means in the background of a screen, reflects the projection light from a projection means by the reflector, and displays a projection image through a translucent screen.

[Brief Description of the Drawings]

[0192]

[Drawing 1] It is the block diagram showing the configuration of the network system which applies this invention.

[Drawing 2] It is the block diagram showing the configuration of projection equipment 100.

[Drawing 3] It is the top view showing the internal structure of the projection section 120.

[Drawing 4] It is the side elevation showing the internal structure of the projection section 120.

[Drawing 5] It is the flow chart which shows malfunction detection processing.

[Drawing 6] It is the flow chart which shows the malfunction detection processing in the case of inspecting by projecting a calibration screen.

[Drawing 7] It is the flow chart which shows the malfunction detection processing in the case of inspecting by projecting a calibration screen as some real projection images.

[Drawing 8] It is the flow chart which shows the malfunction detection processing in the case of inspecting by carrying out color conversion of some real projection images.

[Description of Notations]

[0193]

13 [-- A heat ray cut-off filter, 23 / -- 25 A reflecting mirror, 28 / -- 26 A blue reflective mirror, 29 / -- 27 A red reflective mirror, 30 / -- A green reflective mirror, 31 / -- A blue display panel (light valve) 32 / -- Red display panel (light valve),] -- A projector lens, 20 -- 21 The light source, 24 -- A lens, 22 33 [--

The circuit section, 100 / -- Projection equipment, 110 / -- A screen, 120 / -- The projection section, 130 / -- An image sensor, 140 / -- The malfunction detection section, 150 / -- The notice section, 199 / -- The Internet, 200 / -- Monitor center] -- A green display panel (light valve), 34 -- A heat dissipation fan, 35 -- A foot, 36

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[0192]
[Drawing 1] It is the block diagram showing the configuration of the network system which applies this invention.
[Drawing 2] It is the block diagram showing the configuration of projection equipment 100.
[Drawing 3] It is the top view showing the internal structure of the projection section 120.
[Drawing 4] It is the side elevation showing the internal structure of the projection section 120.
[Drawing 5] It is the flow chart which shows malfunction detection processing.
[Drawing 6] It is the flow chart which shows the malfunction detection processing in the case of inspecting by projecting a calibration screen.
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[Drawing 8] It is the flow chart which shows the malfunction detection processing in the case of inspecting by carrying out color conversion of some real projection images.

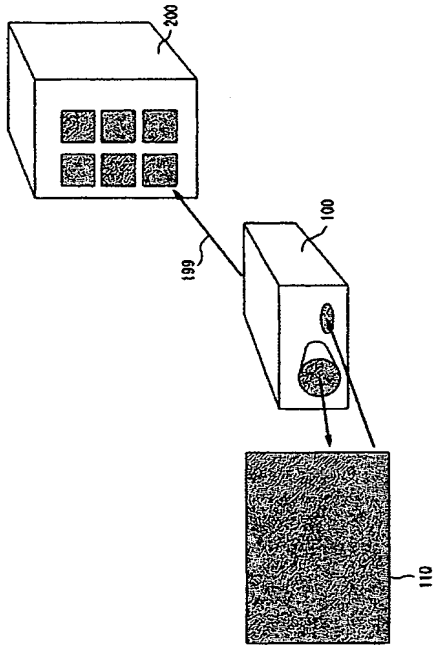
[Translation done.]

* NOTICES *

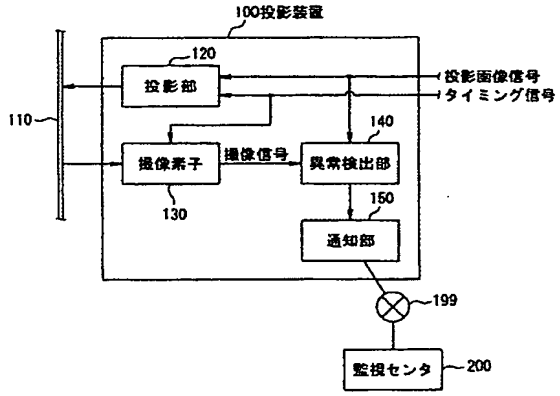
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

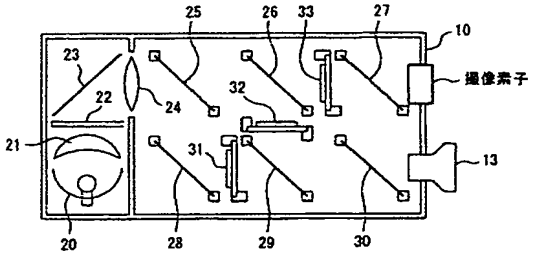
[Drawing 1]



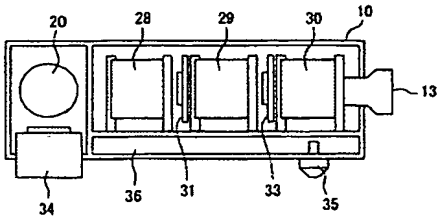
[Drawing 2]



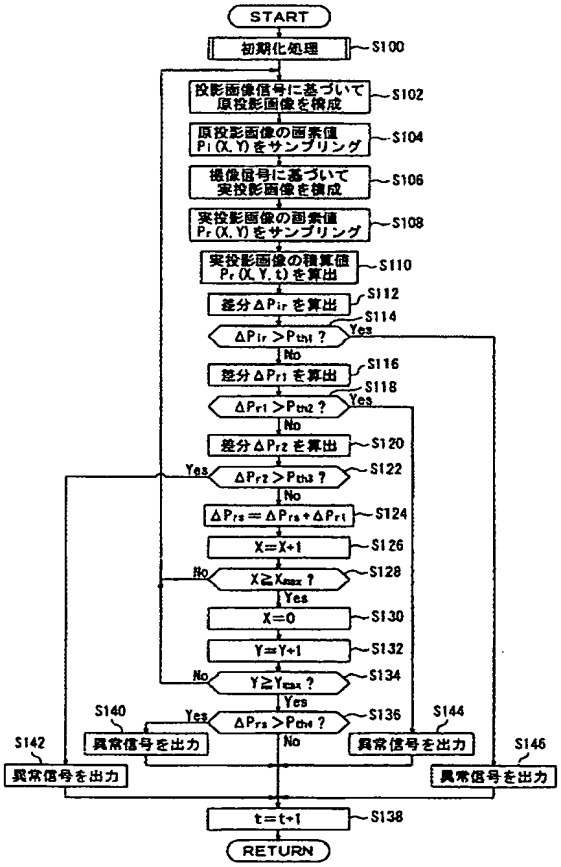
[Drawing 3]



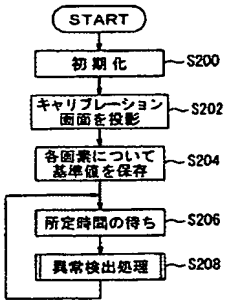
[Drawing 4]



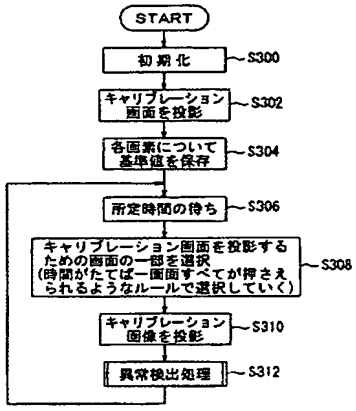
[Drawing 5]



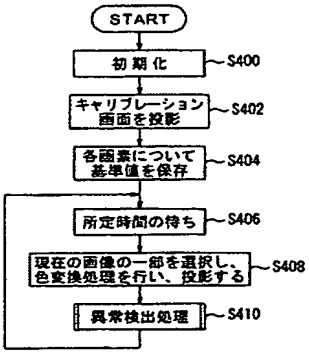
[Drawing 6]



[Drawing 7]



[Drawing 8]



[Translation done.]